Emulex Driver for Linux

Version 8.2

User Manual

Last updated May 15, 2008

Critical Connectivity Solutions™

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Installation

Driver Information

Supported Features

- SNIA-CTP compliant SMI-S 1.1 Provider
- Topology support: FC-AL, point-to-point, fabric with auto-topology negotiation
- Support for 1, 2, 4, and 8 gigabit (Gb) with auto-rate negotiation
- Protocols: SCSI-FCP, FCP-2 (FC-Tape profile, including use of ADISC instead of PLOGI), FC initiator mode
- Tested up to thirty-two host bus adapter (HBA) ports
- Supports the latest HBAnyware® configuration utility version 3.4 as part of the master kit: enabling GUI-based driver configuration, including inband (FC) and out of band (TCP/IP) remote storage area network (SAN) management capability, diagnostics (loopback and diagnostics dump) and FC-SP/Authentication DH-CHAP (Diffie-Hellman Challenge Handshake Authentication Protocol). Refer to the HBAnyware 3.4 User Manual for more information.
- Support for Common HBA API
- Batch firmware download capability
- Support for the sysfs interface
- PCI hot plug support
- Vital Product Data (VPD) support
- “Linux Tools” link on the Linux portion of the Emulex Web site (visit the link to see the available tools)
- Supports the LPe1250, LPe1252, LPe12000 and LPe12002 (8 Gb, 2 Gb and 4 Gb capable HBA's)
- Supports FC-SP DH-CHAP Authentication
- Supports NPIV virtual ports

Prerequisites

For the lpfc Driver Kit

To install the lpfc driver kit, the appropriate distribution kernel development packages must be installed for the currently running kernel, which include the gcc compiler and the kernel sources.

The lpfc driver kit supports the following distributions:

- Red Hat Enterprise Linux 5 and 5.1 (Intel x86, Intel Itanium2, Intel EM64T, AMD64, and PowerPC 64-bit architectures).
- SuSE Linux Enterprise Server 10 SP1 (Intel x86, Intel Itanium2, Intel EM64T, AMD64, and PowerPC 64-bit architectures).
- The Applications kit must be installed to use DH-CHAP Authentication. The Applications kit includes the fcauthd daemon software.

Compatibility

- LPe12000 and LPe12002 (firmware version 1.00a9 or later is recommended)
- LPe1250 and LPe1252 (firmware version 1.00a9 or later is recommended)
- LPe11000, LPe11002 and LPe1150 (firmware version 2.72a2 or later is recommended.)
- LP11000, LP11002 and LP1150 (firmware version 2.72a2 or later is recommended.)
- LP1005DC-CM2 (minimum firmware version 1.90a5)
- LP10000ExDC and LP1050Ex (minimum firmware version 1.91a1)
- LP10000DC and LP10000 (minimum firmware version 1.91a1)
- LP1050DC and LP1050 (minimum firmware version 1.91a1)
- LP9802DC and LP9802 (minimum firmware version 1.91a1)
- LP982 (minimum firmware version 1.91a1)
- LP9402DC, LP9002DC, LP9002L and LP9000 (minimum firmware version 3.93a0)
- LP952L (minimum firmware version 3.93a0)
- LP8000 and LP8000DC
    - If your HBA has a Dragonfly chip version 2.00 or greater, use firmware version 3.93a0.
    - If your HBA has a Dragonfly chip below version 2.00, use firmware version 3.30a7.

  Refer to the LP8000 and LP8000DC Firmware Download page on the Emulex Web site to determine the Dragonfly chip version in use.

Note: NPIV is supported on Emulex 4 Gb and 8 Gb HBAs that fully support SLI-3. Emulex enterprise class (5 digit HBA model number) and Midrange class (4 digit HBA model number) HBAs support SLI-3. Emulex 3 digit model number HBAs do not fully support SLI-3 and therefore do not support NPIV. The LPFC 8.2.X driver supports all HBAs running SLI-2, but NPIV support is not available in SLI-2 mode.

For SLI-3 supported HBAs, use the latest recommended firmware for NPIV support.

Things to Know Before You Download

- You must uninstall any previous lpfc driver kits and/or Application Helper Modules that were installed from the Emulex CD or downloaded from the Emulex Web site, (i.e. not part of a distribution), before installing this driver kit.

Known Issues

- Some Web browsers attempt to continually reload the HBAnyware utility's online help rendering it unusable. In this case, disable the Web browser's JavaScript capability. Refer to the Web browser's documentation for instructions.
- Emulex's HBAnyware configuration utility provides support for LightPulse adapters that are reprogrammed with WWPNs outside the typical Emulex range, such as HP's upcoming Virtual Connect for Fibre Channel on the BladeSystem c-Class platform. In such environments, HBAnyware must be deployed across all servers on the SAN, as well as any other management console used for out-of-band management, so that all adapters appear in the discovery tree.

Installing the Driver Kit

The lpfc-install script installs the lpfcdriver_2.6 RPM.

The RPM:

- Installs the driver source files to the /usr/src/lpfc directory.
- Builds the driver for the currently running kernel.
- Installs the driver to the proper directory for the currently running kernel. Maintenance and errata kernels are supported.

Once the RPM is installed, the lpfc-install script creates a new ramdisk for the currently running kernel so that the lpfc driver is loaded when the kernel is initialized during system startup.

Note: You must uninstall any previous lpfc driver kits and/or Application Helper Modules that were installed from the Emulex CD or downloaded from the Emulex Web site, (i.e. not part of a distribution), before installing this driver kit. This installation will fail if a previous version of the lpfc driver or the Application Helper Module is detected.

Refer to “Uninstalling the Driver Kit” on page 9 and “Uninstalling the Applications Kit” on page 10 for more information.

When invoked without options, the 'lpfc-install' script automatically archives any driver that is shipped as part of the distribution's kernel during the installation procedure. Old drivers that are archived during installation are then restored when the driver kit is uninstalled.

Note: The HBAnyware utility must be installed separately from the driver. Refer to the "Installing the Utilities" on page 10 for more information.

Note: The lpfc-install script does not support custom kernels. For example, kernels with Version_Release strings that do not match those of the original distribution kernel.

To install the Emulex driver for Linux:

1. Install a supported Emulex HBA in the system. Refer to the HBA's Installation manual for specific hardware installation instructions.
2. Remove any previously installed lpfc driver kits and/or Application Helper Modules that were installed from the Emulex CD or downloaded from the Emulex Web site, (i.e. not part of a distribution’s kernel) before proceeding. Refer to “Uninstalling the Driver Kit” on page 9 and “Uninstalling the Applications Kit” on page 10 for more information.
3. Download the driver kit from the Emulex Web site or copy it to the system from the installation CD.
4. Log on as 'root' to a terminal, and unpack the tarball with the following command:

   ```
   tar xzf lpfc_2.6_driver_kit-<driver version>.tar.gz
   ```
5. Change to the directory that is extracted:

   ```
   cd lpfc_2.6_driver_kit-<driver version>/
   ```
6. Execute the 'lpfc-install' script with no options to install the new driver kit. Type:

   ```
   ./lpfc-install
   ```

Once the 'lpfc-install' script has completed successfully, the Emulex lpfc driver is loaded and Fibre Channel disks that are properly connected to the system are accessible. Reboot the system now to enable the newly added driver options in the ramdisk. You can also reboot the system later if you wish.

Driver Kit Install Script Options

The following options are available for use with the Emulex install script for Linux:

- -h,--help - Prints a help message describing command line parameters.
- -u,--uninstall - Uninstalls the currently installed driver kit.

Driver Kit Directory Structure

After installation, the following directory is created on the system.

Table 1: Driver Kit Directory Structure

Directory	Description
/usr/src/lpfc	Driver source files.

Installing the Driver on Unsupported Linux Distributions

The driver kit supports the Linux distributions listed on page 1. As of Linux kernel 2.6.12, the lpfc driver is distributed with the Linux kernel sources. To install the Emulex lpfc driver on an unsupported distribution of Linux, refer to the distribution's Web site or http://kernel.org.

Note: The Emulex version 8.2 driver for Linux is not intended for, and will not operate on, any kernel prior to 2.6.12. If you are using an earlier 2.6 kernel, you must use the Emulex driver for Linux version 8.0.16.x.

Upgrading the Kernel or Applying a Distribution Service Pack or Update

You can install the driver kit into an upgraded kernel. The installation of an update or service pack generally involves updating the kernel.

Note: Some distribution service packs or updates contain an Emulex driver. If the driver version contained in the distribution or service pack is the same version or newer than the currently installed driver kit, re-installation of the driver kit may not be necessary.

Note: The lpfc-install script does not support custom kernels. For example, kernels with Version_Release strings that do not match those of the original distribution kernel.

Note: Follow these steps before installing a new update CD to a distribution or applying a service pack to a distribution. Maintenance and errata kernels are supported.

Installing the Driver Kit into an Upgraded Kernel

To install the driver kit into an upgraded kernel:

1. Execute the lpfc-install script with the '--uninstall' option. Type:

   ```
   /usr/src/lpfc-install --uninstall
   ```
2. Upgrade the kernel and/or distribution.
3. Reboot the system with the new kernel.
4. Download the driver kit from the Emulex Web site or copy it to the system from the installation CD.
5. Log on as 'root' to a terminal, and unpack the tarball with the following command:

   ```
   tar xzf lpfc_2.6_driver_kit-<driver version>.tar.gz
   ```
6. Change to the directory that is extracted:

   ```
   cd lpfc_2.6_driver_kit-<driver version>/
   ```
7. Execute the 'lpfc-install' script with no options to install the new driver kit. Type:

   ```
   ./lpfc-install
   ```
8. Reboot the system to complete re-installation of the Emulex driver.

Booting From a Non-Zero LUN Attached to an Emulex HBA

This section describes how to configure SLES 10 to boot from an FC attached disk device other than /dev/sda. This example uses /dev/sdb.

To boot from a non-zero LUN attached to an lpfc HBA:

1. Configure the Emulex HBA bootBIOS to boot from the desired LUN.
2. Start the standard SLES 10 SP1 installation.
3. At the Installation Settings screen, after configuring the desired partitions, select the **Expert** tab.
4. Select **Booting** to change the bootloader configuration.
5. The Boot Loader Settings window appears. Select the **Boot Loader Installation** tab.
6. In the section labeled Boot Loader Location, select **Custom Boot Partition**, then select the **root partition** (or **boot partition** if you configured one) from the dropdown box.
7. Click the **Boot Loader Options** button. The Boot Loader Options window appears. Select the **Write generic Boot Code to MBR** checkbox.
8. Click **OK**.
9. In the Boot Loader Settings window, Click **Finish**.
10. Proceed with the installation.
11. During the first boot after the installation, use the GRUB command line to change all hd1 references to hd0, then continue the boot process.
12. Edit the GRUB configuration in /boot/grub/menu.lst to change all hd1 references to hd0.

Installing the Applications Kit

Follow these instructions to install the Application Kit on your system. The Applications Kit contains the HBAnyware utility.

Note: If you wish to use DH-CHAP Authentication you must install the Applications kit. The Applications kit includes the fcauthd daemon software. See “DH-CHAP Authentication and Configuration” on page 26 for more information.

Prerequisites

- The lpfc driver must be installed.

Procedure

To install the Applications Kit:

1. Log on as ‘root’.
2. Download the utilities from the Emulex Web site or copy them to the system from the installation CD.
3. Copy the ElxLinuxApps-<AppsRev><DriverRev>.tar file to a directory on the install machine.
4. Change (use cd command) to the directory to which you copied the tar file.
5. Untar the file. Type:

   ```
   tar xvf ElxLinuxApps-<AppsRev><DriverRev>.tar
   ```
6. Uninstall any previously installed versions. Type:

   ```
   ./uninstall
   ```

7. Run the install script. Type:

   ```
   ./install
   ```

8. Enter the type of management you want to use:

   ```
   1    Local Mode  : HBA's on this Platform can be managed by
        HBAnyware clients on this Platform Only.
   2    Managed Mode: HBA's on this Platform can be managed by local
        or remote HBAnyware clients.
   3    Remote Mode : Same as '2' plus HBAnyware clients on this
        Platform can manage local and remote HBA's.
   ```

9. You are prompted as to whether or not to allow users to change management mode after installation. Enter the letter 'y' for yes, or 'n' for no.

Utilities Directory Structure

After installation, the following directories are created on the system.

Table 2: Utilities Directory Structure

Directory	Description
/usr/sbin/hbanyware	HBAnyware files.

Installing the HBAnyware Utility with Web Launch

Prerequisites

Before installing the HBAnyware utility with Web Launch, ensure your systems meet the following requirements.

- The system on which you are installing the Web Launch services package (the server) requires the following:
  - The HTTP server must be configured to handle the JNLP MIME file type. The following MIME file type/file extension must be added to your server configuration:

    ```
    MIME type: application/x-java-jnlp-file
    File Extension: jnlp
    ```
  - The HTTP server must be configured and running.
- The system on which you are running the browser (the client) requires the following:
  - The Java Runtime Environment (JRE) 5.0 or later must be installed. Below are the specific requirements:
    - Sun 32-bit JRE 5.0 or later for Intel based systems (x86 and IA64)
    - IBM 64-bit JRE 5.0 or later for PowerPC
    - Sun 32-bit JRE 5.0 or later x86-64

  Refer to the appropriate vendor documentation for detailed instructions about configuring MIME types, configuring and starting the HTTP server and installing the JRE.
- The HBAnyware utility must be installed before installing HBAnyware with Web Launch.

Procedure

To install HBAnyware with Web Launch:

1. Log on as ‘root’.
2. Navigate to the HBAnyware directory. Type:

   ```
   cd /usr/sbin/hbanyware
   ```
3. Run the install script. Type:

   ```
   ./wsinstall
   ```
4. When prompted, enter the Web server's document root directory. For example:

   ```
   /srv/www/htdocs
   ```
5. You are provided with the IP address of the host and asked if that is the IP address that is being used by your Web server. Answer Y or N as appropriate. If you answer N, you are prompted for the IP address you wish to use.
6. You are asked if your web server listening on the normal default HTTP port (80)? Answer Y or N as appropriate. If you answer N, you are prompted for the port you wish to use.

   You are notified the installation of the HBAnyware Web Launch package has completed.

Installing the HBAnyware Security Configurator

Follow these instructions to install the HBAnyware Security Configurator on your system. The install script is located in the /usr/sbin/hbanyware directory.

Prerequisites

- The lpfc driver must be installed.
- The HBAnyware utility must be installed on all participating systems.

Procedure

To install the HBAnyware Security Configurator utility:

1. Log on as ‘root’.
2. Change (use the cd command) to the directory to which you copied the tar file. (See “Installing the Applications Kit” on page 6 step 2 for reference.)
3. Run the install script with the "ssc" parameter specified. Type:

   ```
   ./install ssc
   ```

Uninstalling the Driver Kit

Note: Driver parameter changes made using the HBAnyware utility or /etc/modprobe.conf persist if the driver is uninstalled. To return to the default settings, you must modify the settings in /etc/modprobe.conf.

Note: You must run the uninstall script that shipped with the version of the driver kit you want to remove.

This section describes how to uninstall a previous version of the Emulex 8.x driver for Linux. The uninstall procedure automatically restores the archived lpfc driver.

To uninstall the lpfc driver:

1. Log on as 'root'.
2. If possible, exit all applications that use Fibre Channel-attached drives, then unmount the drives. If you cannot exit all applications that use Fibre Channel-attached drives, the uninstall will work properly, but you must reboot after the uninstallation is complete.
3. Stop the HBAnyware utility. Type:

   ```
   cd /usr/sbin/hbanyware
   ./stop_hbanyware
   ```
4. Uninstall the Applications Kit. See page 10 for instructions.
5. Copy the lpfc-install script to the temporary directory. For example:

   ```
   cp /usr/src/lpfc/lpfc-install /tmp
   ```
6. Execute the lpfc-install script. with the '--uninstall' option. Type:

   ```
   /tmp/lpfc-install --uninstall
   ```

Uninstalling the Applications Kit

Follow these instructions to uninstall the HBAnyware and lputil utilities and their associated files.

Note: If the HBAnyware Security Configurator is installed, it must be uninstalled before uninstalling the HBAnyware and lputil utilities.

Uninstalling the HBAnyware Security Configurator

Note: You must run the uninstall script that shipped with the version of HBAnyware Security Configurator you want to remove.

To uninstall the HBAnyware Security Configurator:

1. Log on as ‘root’.
2. Change (use cd command) to the directory to which you copied the tar file during installation.
3. Run the uninstall script with the ssc parameter specified. Type:

   ```
   ./uninstall ssc
   ```

Uninstalling HBAnyware with Web Launch

Note: If you installed HBAnyware with Web Launch, you must uninstall it before uninstalling HBAnyware.

To uninstall HBAnyware with Web Launch:

1. Log on as ‘root’.
2. Execute the following script:

   ```
   /usr/sbin/hbanyware/wsuninstall
   ```

This script stops the HBAnyware Web Launch Service daemons (if they are running) and removes all Web Launch related files from the host.

Uninstalling HBAnyware

Note: You must run the uninstall script that shipped with the version of the HBAnyware utility that you want to remove.

Note: If you installed HBAnyware with Web Launch, you must uninstall it before uninstalling HBAnyware.

To uninstall the HBAnyware and lputil utilities and the Application Helper Module:

1. Log on as ‘root’.
2. Change (use cd command) to the directory to which you copied the tar file during installation.
3. Uninstall any previously installed versions. Type:

   ```
   ./uninstall
   ```

Configuration

You can configure the driver by:

- Setting module parameters using modprobe and /etc/modprobe.conf.
- Using the sysfs interface (for parameters that can be changed after loading the driver).
- Using the HBAnyware configuration utility. See the HBAnyware 3.4 User Manual for more information.

Note: Driver parameter changes made using modprobe.conf or the HBAnyware utility persist if the driver is uninstalled. To return to the default settings, you must modify the settings in modprobe.conf.

Note: The Linux 2.6 kernel only supports setting the lpfc_log_verbose, lpfc_devloss_tmo and lpfc_use_adisc driver parameters for individual HBAs.

Other driver parameters must be applied to all HBAs contained in the host. See the “Driver Parameters Reference Table” on page 14 for a complete list of driver parameters.

Driver Configuration Methods Using modprobe and /etc/modprobe.conf

The following sections describe how to set driver parameters using the modprobe command and by manually editing /etc/modprobe.conf.

Note: Emulex recommends using the HBAnyware utility or the hbacmd utility to change parameters. See the HBAnyware User Manual for more information.

Temporary Configuration Method

When you manually load the driver as a module using the modprobe command and change one or more driver parameter values, it is a temporary configuration. These changes are considered temporary because they are valid for the current session only or until the driver is unloaded again. Modprobe uses the modprobe.conf file, but parameters passed to it using the command line override parameters in the modprobe.conf file.

Values can be expressed in hexadecimal or decimal notation.

Example of Temporary Configuration

You want to temporarily set lun_queue_depth to 20 (default is 30) for all host bus adapters in your system. Load the driver with the following command:

```
modprobe lpfc lpfc_lun_queue_depth=20
```

Persistent Configuration Method

To make the driver parameters persistent across module loads and reboots, modify the /etc/modprobe.conf file. If driver parameters are modified in /etc/modprobe.conf, the driver must be reloaded for the parameters to take effect. Also a new ramdisk image is required if you want the changes to take effect in the next boot. See “Creating a New Ramdisk Image” on page 13 to learn how.

The driver parameters are specified in /etc/modprobe.conf via the "options" command. For example the following sets the verbose flag.

```
options lpfc lpfc_log_verbose=0xffff
```

If the same option is specified in both the /etc/modprobe.conf and on the modprobe command line, the option setting in the command line takes precedence.

Temporary Driver Configuration by Read/Write to sysfs

Sysfs is a virtual filesystem that exposes the structure of the system. It also includes interfaces to driver parameters through which the driver parameters can be viewed and modified. Since these interfaces are available only after driver load, only those parameters that can be modified dynamically can be changed. However, all driver parameters can be read through sysfs.

Note: Sysfs changes only exist during driver load and are lost when the driver is unloaded or rebooted.

The sysfs filesystem is mounted and available as /sys. You must first identify the scsi_host which represents the HBA for which you wish to modify the driver parameters. All scsi_hosts bound to the lpfc driver can be viewed with the following command:

```
# ls -d /sys/bus/pci/drivers/lpfc/*/host*
```

Assuming you are interested in HBA scsi_host 7, you can list the driver parameters for this particular HBA as:

```
#ls -l /sys/class/scsi_host/host7/lpfc*
```

An example output is as follows:

```
-r--r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_ack0
-rw-r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_fcp_bind_method
-r--r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_fcp_class
-rw-r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_fdmi_on
-r--r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_link_speed
-rw-r--r--  1 root root 4096 Feb 28 15:34 /sys/class/scsi_host/host7/lpfc_log_verbose
-r--r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_lun_queue_depth
-rw-r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_max_luns
-rw-r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_nodev_tmo
-rw-r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_scan_down
-r--r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_topology
-rw-r--r--  1 root root 4096 Feb 28 17:03 /sys/class/scsi_host/host7/lpfc_use_adisc
```

Notice that the driver parameters are available as files. Reading a file displays the current value of a driver parameter. If the permissions allow it, you can write a value to the file and it will take effect immediately.

For example:

```
[root@emulex]# cat /sys/class/scsi_host/host7/lpfc_log_verbose
0
```

Notice that the current value of lpfc_log_verbose is zero. To set it to 0xffff:

```
[root@emulex]# echo 0xffff > /sys/class/scsi_host/host7/
lpfc_log_verbose
[root@emulex]# cat /sys/class/scsi_host/host7/lpfc_log_verbose
0xffff
```

Creating a New Ramdisk Image

The lpfc-install script creates a ramdisk containing the lpfc driver for the currently running kernel.

Note: You must perform this step whenever the lpfc options in /etc/modprobe.conf are changed and you want the change to take effect on the next reboot.

For Installed lpfc Driver Kits

To create a new initial ramdisk image:

1. su to ‘root’.
2. Type:

   ```
   cd /usr/src/lpfc
   ```

3. Execute the lpfc-install script using the '--createramdisk' option. Type:

   ```
   ./lpfc-install --createramdisk
   ```

For Distribution In-Box lpfc Drivers

To create a new initial ramdisk image:

- For SLES10 PPC64 architecture distributions type:

  ```
  # mkinitrd -k vmlinux -i initrd
  ```

- For SLES10 non-PPC64 architecture distributions type:

  ```
  # mkinitrd -k vmlinuz -i initrd
  ```

- For RHEL5 PPC64 and non-PPC64 architecture distributions type:

  ```
  # mkinitrd -f /boot/initrd-<kernel-version>.img <kernel-version>
  ```

Dynamically Adding LUNs and Targets

The Emulex driver for Linux enables you to dynamically add LUNs and targets without unloading or reloading the lpfc module and without resetting the adapter.

To rescan an HBA's targets with sysfs given the HBA's host number (in this example 3), type:

```
echo "- - -" > /sys/class/scsi_host/host3/scan
```

To limit the rescan to a particular target, given the HBA's host number (in this example 3) and the target number (in this example 2), type:

```
echo "- 2 -" > /sys/class/scsi_host/host3/scan
```

You can also use the Emulex lun_scan script in /usr/sbin/lpfc.

Driver Parameters Reference Table

The driver parameters determine some aspects of the driver behavior. The following tables list the driver parameters. Some driver parameters can be modified and take effect only on a driver load while others can be modified dynamically and take effect immediately. The tables also list the default, minimum and maximum values for these parameters.

Note: The Linux 2.6 kernel only supports setting the lpfc_log_verbose, lpfc_devloss_tmo and lpfc_use_adisc driver parameters for individual HBAs.

Other driver parameters must be applied to all HBAs contained in the host.

Table 3: lpfc Static Parameters (Requires a driver reload to change)

Variable	Default	Min	Max	Comments	Visible using sysfs
lpfc_ack0	0	0=Off	1=On	Uses ACK0 for class 2.	Yes
lpfc_dev_loss_initiator	0	0	1	Engage devlos timeout for initiators.	Yes
lpfc_discovery_threads	32	1	64	Specifies the maximum number of ELS commands that can be outstanding for a discovery. **NOTE:** The discovery_threads parameter will default to a value of 64 for private loop topologies regardless of the configured value. If there are multiple ports configured on the host the value of 64 will only be used for those ports that are connected in a private loop topology. The configured value will be used for all other ports.	No
lpfc_enable_da_id	0	0 = Disabled (default) 1 = enable – a DA_ID CT command will be sent to the fabric when logging out.		This parameter controls whether the driver will issue a DA_ID CT command to the fabric when vports logout of the fabric.	Yes

Table 3: lpfc Static Parameters (Requires a driver reload to change) (Continued)

Variable	Default	Min	Max	Comments	Visible using sysfs
lpfc_enable_hba_ heartbeat	1	0 = heartbeat disabled 1 = heartbeat enabled		Controls the HBA heartbeat logic in the driver. If heartbeat is enabled and the heartbeat logic detects that the HBA is non functional, the driver will shutdown the HBA.	No
lpfc_enable_hba_reset	1	0 = hba reset disabled 1 = hba reset enabled		Controls whether hba_resets will be allowed by the driver to pass to the HBA. This is used as a debugging tool.	No
lpfc_enable_npiv	0	0	1	This parameter controls the driver's ability to use NPIV to create virtual ports. It defaults to off (0) which prevents the driver from creating any virtual ports. When enabled (set to 1) it enables you to create and delete virtual ports (if supported by the fabric). **NOTE:** You can only enable vports on 4G and 8G HBAs.	Yes
lpfc_fcp_class	3	2	3	The Fibre Channel class for FCP data transmission.	Yes
lpfc_hba_queue_depth	8192	32	8192	The maximum number of FCP commands that can queue to an Emulex HBA.	Yes
lpfc_lun_queue_depth	30	1	128	The default maximum commands sent to a single logical unit (disk).	Yes
lpfc_scan_down	1	0=Off	1=On	Selects method for scanning ALPA to assign a SCSI ID.	Yes
lpfc_sg_seg_cnt	64	64	256	Controlls the max scatter gather segment count passed to the driver.	Yes
lpfc_sli_mode	0	0 = auto (default) 2 = SLI 2 mode 3 = SLI 3 mode (only available on newer HBAs)		This parameter allows you to force the SLI mode requested by the HBA driver.	No

Table 3: lpfc Static Parameters (Requires a driver reload to change) (Continued)

Variable	Default	Min	Max	Comments	Visible using sysfs
lpfc_max_luns	256	1	32768	Specifies the maximum number of LUN IDs per target. A value of 20 means LUN IDs from 0 to 19 are valid. The SCSI layer will scan each target until it reaches the specified LUN ID.	Yes
lpfc_multi_ring_rctl	4	1	255	Identifies RCTL for additional ring configuration. **NOTE:** Only used when multi_ring_support is enabled.	Yes
lpfc_multi_ring_support	1	1	2	Determines the number of primary SLI rings over which to spread IOCB entries.	Yes
lpfc_multi_ring_type	5	1	255	Identifies TYPE for additional ring configuration. **NOTE:** Only used when multi_ring_support is enabled.	Yes
lpfc_use_msi	0	0 = MSI disabled 1 = MSI enabled 2 = MSI-X enabled		Controls whether the driver uses Message Signaled Interrupts.	Yes

All lpfc dynamic parameters are read/write using sysfs.

Table 4: lpfc Dynamic Parameters (Do not require a driver reload to change)

Variable	Default	Min	Max	Comments
lpfc_cr_count	1	1	255	This parameter determines the values for I/O coalescing for cr_delay (msec) or cr_count outstanding commands.
lpfc_cr_delay	0	0	63	This parameter determines the values for I/O coalescing for cr_delay (msec) or cr_count outstanding commands.
lpfc_devloss_tmo	30	0	255	Seconds to hold I/O error if device disappears. **NOTE:** Emulex recommends setting the lpfc_devloss_tmo parameter to 60 when npiv is enabled.

Table 4: lpfc Dynamic Parameters (Do not require a driver reload to change) (Continued)

Variable	Default	Min	Max	Comments
lpfc_enable_auth	0	0	1	This driver property specifies if the DH-CHAP is enabled or not. When set to 1, DH-CHAP is enabled. When set to 0, DHCHAP support is disabled. **NOTE:** This property requires a link reset to activate.
lpfc_fdmi_on	0	0	2	False (0) if disabled. (1) or (2) if enabled depending on type of support needed.
lpfc_link_speed	0	0=auto select 1=1G 2=2G 4=4G 8=8G		Sets link speed.
lpfc_log_verbose	0x0	0x0	0xffff	(bit mask) Extra activity logging.
lpfc_nodev_tmo (depricated)	30	1	255	This parameter will not work if you altered lpfc_devloss_tmo. **NOTE:** This is a deprecated field and lpfc_devloss_tmo should be used instead.
lpfc_pci_max_read	2048	512, 1024, 2048, 4096		Maximum DMA read byte count.
lpfc_poll	0	1= poll wiith interupts enabled 3 = poll and disable FCP ring interrupts		Sets FCP ring polling mode control.
lpfc_poll_tmo	10	1	255	Milliseconds the driver waits between polling FCP ring interrupts.
lpfc_topology	0	0x0=loop then P2P 0x2=P2P only 0x4=loop only 0x6=P2P then loop		Fibre Channel link topology (defaults to loop, if it fails attempts point-to-point mode).
lpfc_use_adisc	0	0=Off	1=On	Sends ADISC instead of PLOGI for device discovery or RSCN.

Using udev for Persistent Naming

SLES 10 is configured by default with udev to provide persistent names for hard disks, including FC attached disks.

Using udev to Discover Logical to Physical Mappings for sd Devices

Persistent names for sd devices are provided in the /dev/disk/by-id directory.

To find the persistent udev name for the disk which is currently sdc, type:

```
# cd /dev/disk/by-id
# ls -l | grep sdc
```

The sample output is shown below:

```
lrwxrwxrwx 1 root root  9 2006-08-01 19:08 scsi-32000000c5005d6e6 -> ../../sdc
```

In the above example, the disk has no partitions. If the disk had two partitions, the output would look like the following:

```
lrwxrwxrwx 1 root root  9 2006-08-01 19:08 scsi-32000000c5005d6e6 -> ../../sdc
lrwxrwxrwx 1 root root 10 2006-08-01 19:08 scsi-32000000c5005d6e6-part1 -> ../../sdc1
lrwxrwxrwx 1 root root 10 2006-08-01 19:08 scsi-32000000c5005d6e6-part2 -> ../../sdc2
```

Configuring the System to Boot From SAN Using Persistent Names

To use a persistent name for a boot device (SLES 10):

1. In /boot/grub/menu.lst, find the kernel line for the default boot. For example:

   kernel /boot/vmlinuz root=/dev/sda2 vga=0x314

2. Find the persistent name for the root partition (following "root=" on the kernel line) by using the instructions in "Using udev to Discover Logical to Physical Mappings for sd Devices" section on this page.
3. In the same file, /boot/grub/menu.lst, replace the text after "root=" with the partition's persistent name. For example:

   kernel /boot/vmlinuz root=/dev/disk/by-id/scsi-32000000c5005d6e6-part2 vga=0x314

4. Change any mounts listed in /etc/fstab which refer to this root partition by either it's /dev/sd name or a file system LABEL to use the persistent name as well.

To use a persistent name for a boot device (RHEL 5):

1. In /boot/grub/grub.conf, find the kernel line for the default boot. For example:

   kernel /boot/vmlinuz -<kernel version> ro root=/dev/sda2

2. Find the persistent name for the root partition (following "root=" on the kernel line) by using the instructions in "Using udev to Discover Logical to Physical Mappings for sd Devices" section on this page.
3. In the same file, /boot/grub/menu.lst, replace the text after "root=" with the partition's persistent name. For example:

   kernel /boot/vmlinuz -<kernel version> ro root=/dev/disk/by-id/scsi-32000000c5005d6e6-part2

4. Change any mounts listed in /etc/fstab which refer to this root partition by either it's /dev/sd name or a file system LABEL to use the persistent name as well.

Using udev with st Devices

The udev rules for tape devices are the same for disk devices. There must be a unique ID that persists across initiator reboots and persists regardless of discovery order.

Another thing to consider is whether or not the tape device is one of many SCSI tape devices residing behind an FC controller, or if it is an FC-Tape device. If it an FC-Tape device, then the WWPN is unique and can be used to create the persistent name. In fact, the scsi_id program should return this as the unique identifier with a single digit prefix.

If the FC controller has multiple SCSI tape devices behind it, the WWPN is not unique and the persistent name must use multiple information elements to build the unique ID.

Below are examples of each scenario. The first example is that of an FC-Tape device. This example uses SCSI generic (sg) rather than the SCSI tape driver.

```
[root@localhost ~]# scsi_id -g -s /sys/class/scsi_generic/sg0
   350060b000029b592
```

The value returned has a leading prefix of 3. This value is the NAA type and what follows is the controller's WWPN.

Below is an example of the same tape device and a scsi_id call. The response is the same.

```
[root@localhost ~]# scsi_id -g -s /sys/class/scsi_tape/nst0
   350060b000029b592
```

In both examples, -g was needed because the vendor and model for this tape device were not in /etc/scsi_id.config.

Below is another example for a different FC-Tape Vendor. Notice that the answer is similar with respect to the leading digit and the WWPN.

```
[root@localhost ~]# /sbin/scsi_id -g -s sys/class/scsi_tape/nst0
35005076300015101
```

Below is an example of a FC-SCSI Tape device. Notice that when the Emulex driver loads, the SCSI midlayer discovers the SCSI tape devices as follows:

```
scsi scan: INQUIRY to host 14 channel 0 id 0 lun 0
scsi: unknown device type 12
Vendor: ADIC      Model: SNC 4000          Rev: 42d4
Type:   RAID                               ANSI SCSI revision: 03
Attached scsi generic sg5 at scsi14, channel 0, id 0, lun 0,  type 12
scsi scan: INQUIRY to host 14 channel 0 id 0 lun 1
Vendor: ADIC      Model: Scalar 24         Rev: 227A
Type:   Medium Changer                     ANSI SCSI revision: 02
Attached scsi generic sg6 at scsi14, channel 0, id 0, lun 1,type 8
scsi scan: INQUIRY to host 14 channel 0 id 0 lun 2
Vendor: IBM       Model: ULTRIUM-TD2       Rev: 38D0
Type:   Sequential-Access                  ANSI SCSI revision: 03
Attached scsi tape st0 at scsi14, channel 0, id 0, lun 2
st0: try direct i/o: yes (alignment 512 B), max page reachable by HBA
4503599627370495
Attached scsi generic sg7 at scsi14, channel 0, id 0, lun 2,  type 1
scsi scan: INQUIRY to host 14 channel 0 id 0 lun 3
Vendor: IBM       Model: ULTRIUM-TD2       Rev: 38D0
Type:   Sequential-Access                  ANSI SCSI revision: 03
Attached scsi tape st1 at scsi14, channel 0, id 0, lun 3
st1: try direct i/o: yes (alignment 512 B), max page reachable by HBA
4503599627370495
Attached scsi generic sg8 at scsi14, channel 0, id 0, lun 3,  type 1
```

This log output shows a controller at LUN 0, the medium changer at LUN 1 and two SCSI tape devices at LUNs 2 and 3. The example below is what the scsi_id call returns:

```
[root@localhost ~]# scsi_id -g -s /sys/class/scsi_tape/nst0
1IBM     ULTRIUM-TD2     1110133831
[[root@localhost ~]# scsi_id -g -s /sys/class/scsi_tape/nst1
1IBM     ULTRIUM-TD2     1110133994
```

Notice that the unique ID is actually comprised of three value with space delimiters. A udev rule must have a unique ID for the device, meaning all three parts of this returned string are required. To do this, use the following command.

```
[root@localhost ~]# scsi_id -u -g -s /sys/class/scsi_tape/nst0
1IBM_____ULTRIUM-TD2_____1110133831
[root@localhost ~]# scsi_id -u -g -s /sys/class/scsi_tape/nst1
1IBM_____ULTRIUM-TD2_____1110133994
```

Creating the udev persistent name for SCSI tape uses the same process as SCSI disk once the SCSI ID call needed to extract a unique ID is known.

Below is the rule for the FC-Tape device:

```
BUS="scsi", SYSFS{vendor}="HP", SYSFS{model}="ULTRIUM 3-SCSI",
PROGRAM="/sbin/scsi_id -p 0x83 -u -g -s /sys/class/scsi_tape/
nst%n",RESULT="350060b000029b592", SYMLINK="fc_lun_st%n"
```

The rule for the FC-SCSI tape device follows:

```
BUS="scsi", SYSFS{vendor}="IBM", SYSFS{model}="ULTRIUM-TD2",
PROGRAM="/sbin/scsi_id -p 0x83 -u -g -s /sys/class/scsi_tape/
nst%n",RESULT="1IBM____ULTRIUM-TD2_____1110133831",
SYMLINK="fc_lun_st%n"
BUS="scsi", RESULT="1IBM_____ULTRIUM-TD2_____1110133994",
SYMLINK="fc_lun_st%n"
```

Create a new file named /etc/udev/rules.d/45-local.rules and put the appropriate rule in it. Then run udevtrigger to reload the udev rules.

And finally, here is the output of the rule:

```
[root@localhost ~]# udevtrigger
[root@localhost ~]# ls -al /dev/fc*
lrwxrwxrwx  1 root root 3 Apr  7 15:03 fc_lun_st0 -> st0
lrwxrwxrwx  1 root root 3 Apr  7 15:03 fc_lun_st1 -> st1
```

Further Information About Persistent Names

Refer to the following references for more information on persistent naming:

http://www.kroah.com/linux/talks/ ols_2003_udev_paper/Reprint-Kroah-Hartman-OLS2003.pdf

http://www.reactivated.net/udevrules.php by Daniel Drake (dsd)

http://kernel.org/pub/linux/utils/kernel/hotplug/udev_vs_devfs by Greg Kroah-Hartman

http://linux.dell.com/devlabel/devlabel.htm

http://www.novell.com/documentation/sles10/pdfdoc/stor_evms/stor_evms.pdf

Working with Virtual Ports (vports)

Creating, Deleting and Displaying vports

Vports are created through sysfs entries that are presented in the physical port's sysfs directory. The vport_create and vport_delete sysfs entries are discussed in the sysfs section, but there are also three scripts for creating, deleting and displaying vports. The scripts reside in the /usr/sbin/lpfc/scripts directory and are part of the HBAnyware Applications kit.

When NPIV is enabled and vports are configured it may take longer for the HBA to finish discovery in some cases due to the fact that each virtual port must perform discovery independently. As more vports are configured the amount of time that the driver and HBA take to finish discovery of remote ports on the SAN will increase. To compensate for this extended amount of time taken in discovery it is recommended that the user set the lpfc_devloss_tmo parameter to 60 when npiv is enabled.

Note: Ensure you are using the latest recommended firmware for Vport functionality. Check the Emulex Web site for the latest firmware.

Note: Loop devices and NPIV are not supported on the same port simultaneously. If you are running a loop topology and you create a vport, the vport's link state will be off line.

Note: You can only create virtual ports on 4G and 8G HBAs. You cannot create virtual ports on 1G and 2G HBAs.

The mkvport.sh Script

You can use the mkvport script to create vports. To see the usage information, run the script with no parameters specified. The mkvport.sh script uses the following syntax:

```
./mkvport.sh <Physical Port's Host number> <Port Name> <Node Name>
```

For example:

```
> ./mkvport.sh host7 10000000c94ac63a 20010000c94ac63a
```

would create a vport with port name of 10000000c94ac63a and a node name of 20010000c94ac63a on the physical port with scsi_host name "host7". This script will fail if the vport is not created.

Note: You must supply the physical port's host number, WWPN and WWNN when using the mkvport.sh script.

Note: It is possible for a vport to be created successfully, but be in "failed" state. For example, loop devices and NPIV are not supported on the same port simultaneously. If you are running a loop topology and you create a vport, the vport's link state will be off line

The rmvport.sh Script

You can use the rmvport script to delete vports. To see the usage information, run the script with no parameters specified. The rmvport.sh script uses the following syntax:

```
./rmvport.sh <Virtual Port's Host number>
```

Or

```
./rmvport.sh <Port Name> <Node Name>
```

For example

```
> ./rmvport.sh 10000000c94ac63a 20010000c94ac63a
```

would delete the vport with port name of 10000000c94ac63a and node name of 20010000c94ac63a. This script will fail if the vport is not deleted and may take up to 30 seconds to complete.

Note: You must un-map, un-mount, and flush I/O to vport connected devices before deleting the vport.

The lsvport.sh Script

You can use the lsvport script to list the vports and physical ports that are present on the system. Run the script with no parameters to display port information.

For example:

```
[root@curly scripts]# ./lsvport.sh
lpfc0: host6 10000000c93a5b5e:20000000c93a5b5e LP10000 NPIV Not Supported
lpfc1: host7 10000000c93a5b5d:20000000c93a5b5d LP10000 NPIV Not Supported
lpfc2: host8 10000000c93cc8dd:20000000c93cc8dd LPe12000 NPIV Physical
  lpfc4: host10 10000000c94ac63a:20010000c94ac63a  NPIV Virtual (VPI 1)
lpfc3: host9 10000000c93cc8dc:20000000c93cc8dc LPe12000 NPIV Physical
[root@curly scripts]#
```

For LPFC0 and LPFC1, "NPIV Not Supported" means that this HBA/firmware combination does not support the creation of vports.

For LPFC2, "NPIV Physical" refers to a physical port of this HBA.

For LPFC4, "NPIV Virtual" refers to a vport of this HBA.

The vport Sysfs Tree

When a vport is created, two new directories are created in the class tree:

```
/sys/class/scsi_host/hostY/
/sys/class/fc_host/hostY/
```

Creating a new vport also creates a new sysfs directory in the bus and devices tree:

```
[root@curly scripts]# ls /sys/bus/pci/drivers/lpfc/0000:07:00.0/host8/
fc_host:host8  host10  power  scsi_host:host8  uevent
[root@curly scripts]# ls /sys/bus/pci/drivers/lpfc/0000:07:00.0/host8/host10
fc_host:host10  power  scsi_host:host10  uevent
```

Above host 8 is the physical port and host 10 is a virtual port that was created on host 8.

Driver Version 8.2.0.x sysfs Structure

For the 8.2.0.x driver the fc_vport directory does not exist (yet) so a link from the physical port to the vport is present in the fc_host's device directory.

```
[root@doc ~]# ls /sys/class/fc_host/host5/device/
fc_host:host5  power scsi_host:host5
host6 uevent
```

To find the vports that have been created by a physical port you can list the fc_host's device directory for the physical port. This gives you a link to the fc_host and scsi_host directory as usual, but also displays a list of vports (in the form of hostx) that were created on this physical port. In the previous example, host6 is a vport of physical port host5.

Vport sysfs Entries

The following table describes vport sysfs entries.

Note: Vport sysfs entries in Table 5 are only present if the driver was loaded with lpfc_enable_npiv enabled.

Table 5: Vport sysfs Entries

Vport sysfs Entries	Type	Range/ Input	Location and Description
npiv_vports_inuse	read-only	integers	/sys/class/scsi_host/hostX/npiv_vports_inuse This entry displays the number of vports that were created on this fc_host. This sysfs entry will only exist if the vport_create and vport_delete sysfs entries exist. If an fc_host does not support NPIV then this sysfs entry may not exist. **NOTE:** Use this sysfs entry along with max_npiv_vports to determine whether the maximum number of vports have been created on this fc_host.

Table 5: Vport sysfs Entries (Continued)

Vport sysfs Entries	Type	Range/ Input	Location and Description
max_npiv_vports	read-only	integers	/sys/class/scsi_host/hostX/max_npiv_vports This entry displays the maximum number of vports that are supported by the fc_hosts underlying hardware. This sysfs entry will only exist if the vport_create and vport_delete sysfs entries exist. If an fc_host does not support NPIV then this sysfs entry may not exist. **NOTE:** Use this sysfs entry along with npiv_vports_inuse to determine whether the maximum number of vports have been created on this fc_host.
vport_create	write-only	WWPN; WWNN	/sys/class/scsi_host/hostX/vport_create This entry creates a vport on the physical port that hostX is located on. The new vport will have present a WWPN and WWNN on the fabric as indicated by the WWPN and WWNN that is input to this sysfs entry. This sysfs entry will return a 0 if the vport creation was successful. A non-zero value indicates that the vport failed to be created. If an fc_host does not support NPIV then this sysfs entry may not exist. **NOTE:** It is possible for the vport creation to succeed but for the vport to be in a failed or inoperative state. Use the new sysfs tree created by the new vport to check the state of the new vport.
vport_delete	write-only	WWPN; WWNN	/sys/class/scsi_host/hostX/vport_delete This entry deletes a vport on the physical port that hostX is located on. The vport matching the WWPN and WWNN will be immediately deleted. This entry returns a 0 if the vport deletion was successful. A non-zero value indicates that the vport failed to be deleted. If an fc_host does not support NPIV then this sysfs entry may not exist. **NOTE:** This entry will delete the vport even if there are mounted file systems being accessed through this vport and/or open files.
node_name	read-only	16 byte hex. value	/sys/class/fc_host/hostX/node_name This entry displays physical or virtual port's node name. This is the value that is assigned by you upon creation and transmitted to the fabric upon fabric login.
port_name	read-only	16 byte hex. value	/sys/class/fc_host/hostX/port_name This entry displays physical or virtual port's port name. This is the value that you assign when you create a vport. It is transmitted to the fabric upon fabric login.

Table 5: Vport sysfs Entries (Continued)

Vport sysfs Entries	Type	Range/ Input	Location and Description
lpfc_restrict_login	read/ write	0=Off 1=On (default)	/sys/class/scsi_host/hostX/lpfc_restrict_login (vports only) This entry sets the vport's behavior when discovering targets in the SAN. The default behavior (1) prevents the vport from logging into other Initiator ports in the SAN. It will also reject logins from other ports in the SAN because it assumes that all ports that send a PLOGI are Initiators. When this sysfs entry is turned off the driver will attempt to login to every port that it can access in the SAN and will accept logins from all ports. **NOTE:** This parameter was created to reduce the amount of hardware resources (RPI) that the driver requires. In a SAN where there are other initiators this feature will greatly reduce the number of RPI that the driver utilizes.
lpfc_peer_port_login	read/ write	0=Off (default) 1=On	/sys/class/scsi_host/hostX/lpfc_peer_port_login This entry sets the port's behavior when discovering targets in the SAN. The default behavior (0) will only login to nports that are physically located on a different port. The port will still attempt to login to targets on all other ports (including the other port in a dual ported HBA). If this parameter is turned on (1) then the port will attempt to login to all nports, even if they are physically located on the same port. **NOTE:** This parameter was created to reduce the amount of hardware resources (RPI) that the driver requires. In a configuration where there are many vports on one physical port this feature will greatly reduce the number of RPI that the driver utilizes.

Vport Configuration Limits

The following is a list of limits that are supported by the 8.2 driver and configurations that were tested with it. It is highly recommended that you adhere to these limits. Configurations exceeding any one or more of these limits are unsupported. These limits are broken up into two groups. Enforced limits are limits that the driver is able to enforce and will prevent the user from exceeding. Un-enforced limits are limits that the driver cannot enforce and configurations that exceed these limits are unsupported.

Configuration limits:

- All I/O to devices accessed through a vport must be stopped and all file systems must be unmounted before the vport is deleted.
- Delete all vports created from each physical port before unloading the driver for those physical ports.
- For enterprise class HBAs, the maximum number of virtual ports configurable on a physical port is 64. The hardware will allow more than 64 vports to be created, but the driver has only been qualified at 64. For mid-range HBAs, the maximum number of vports configurable on a physical port is 16.
- The maximum number of LUNs supported on each driver port is 256.
- The maximum number of targets supported for each driver port is 255.

- The maximum number of driver ports in one zone is 64. This limit is based on the system's ability to recover from link events within the time constraints of the default timers. The use-cases of NPIV that involve virtual server environment include associating a virtual port with a virtual machine, and placing the virtual machine in its own zone. This will result in one virtual port per zone. In the case of load balanced environments, this can increase typically to two virtual ports per virtual machine, to a practical limit of something far less than 50. In the NPIV cases not related to virtual server environments, zoning will typically be initiator-zoning, again resulting in one virtual port, or a low number of virtual ports in the case of load-balancing, within a given zone. If there are too many virtual ports within a single zone, expected behavior will include devices going lost after link events.
- Minimum lifetime of a virtual port: 60 seconds. There is an un-enforced limit of 60 seconds between the creation of a virtual port and the deletion of the same virtual port. Virtual ports are designed to be an entity that lives for a long time in the system and the creation of vports is asynchronous. This means that a virtual port might not be finished with Fibre Channel or SCSI discovery when the command to create a virtual port is finished.
- SMB (3 digit model number) HBAs must be zoned so that they can not access adapters with virtual ports configured. SMB HBAs have a limited number of resources that make it impossible to operate in the same zone as an HBA that has configured virtual ports.

DH-CHAP Authentication and Configuration

The Emulex driver for Linux version 8.2.0.x supports the FC-SP/Authentication DH-CHAP (Diffie-Hellmann Challenge Handshake Authentication Protocol). To activate FC-SP/Authentication between the HBA host port and Fabric F_port using DH-CHAP, you add the DH-CHAP associated driver parameters to the driver configuration file. See "Driver Configuration Methods Using modprobe and /etc/modprobe.conf" on page 11 for more information.

The Emulex driver for Linux version 8.2.0.x supports MD5 and SHA-1 hash functions and supports the following DH groups: Null, 1024, 1280, 1536, and 2048.

Note: This version of the driver supports for N-Port to F-Port authentication only and does not support N-Port to N-Port authentication.

Note: If you wish to use DH-CHAP Authentication you must install the Applications kit. The Applications kit includes the fcauthd daemon software. See "Installing the Applications Kit" on page 6 for instructions.

Enabling Authentication

Enabling authentication is a three step process. To enable authentication:

- The fcauthd daemon must be running.
- The lpfc_enable_auth module parameter must be set to enabled.

  Note: You can also enable authentication using the HBAnyware 3.4 configuration utility. Refer the the HBAnyware 3.4 User Manual for more information.

- Configure an HBA port to initiate requests for authentication, respond to requests for authentication, or both.

The lpfc_enable_auth Driver Parameter

Use the lpfc_enable_auth driver parameter to enable or disable driver authentication support. The lpfc_enable_auth driver parameter can be set using the modprobe command or by manually editing /etc/modprobe.conf and creating a new ramdisk. Setting lpfc_enable_auth does not mean a port will initiate authentication requests or process requests for authentication; it simply enables authentication support in the driver. You can also set lpfc_enable_auth by writing 1 to the lpfc_enable_auth sysfs parameter.

The default setting for the lpfc-enable-auth module parameter is "disabled". Refer to Table 4 on page 16 for the parameter values.

The fcauthd Daemon

The Emulex LPFC driver uses the fcauthd daemon to perform authentication tasks. The fcauthd daemon is installed with the Applications kit. The fcauthd daemon must be running to configure an HBA port so it can initiate authentication requests or respond to authentication requests.

To load the driver with authentication enabled, the fcauthd daemon should be running prior to loading the driver. The driver can start with authentication enabled if the daemon is not running, but all ports will be placed into an error state and the link state of each port will be down. When the daemon is started the driver will communicate with the daemon, reset the HBA and process authentication requests. To start or stop the daemon, use the /etc/init.d/fcauthd script. This script accepts the standard daemon parameters: start, stop, reload, status, restart, and condrestart.

Once the driver is loaded, it only needs the authentication daemon when authentication is performed (e.g. during link up or re-authentication). If the daemon is not running (because it has crashed, hung, or has been stopped) and the driver attempts authentication, then authentication will fail.

The script syntax is /etc/init.d/fcauthd <parameter>.

Note: The 8.2.0.X driver connects directly to the fcauthd daemon. To unload the driver you must first stop the fcauthd daemon. This will close the netlink connection and allow the LPFC driver to unload. The fcauthd daemon can be stopped using /etc/init.d/fcauthd stop or /usr/sbin/hbanyware/stop_hbanyware which will shutdown both the fcauthd daemon and the HBAnyware utility.

fcauthd Daemon Parameters

The fcauth daemon supports the following parameters:

- start - To start the fcauthd daemon pass the start command to the fcauthd script. This command loads the daemon into memory, opens a netlink for the driver to connect to, and reads the authentication configuration database into memory for use by the LPFC driver.
- stop - To stop the fcauthd daemon pass the stop command to the fcauthd script. This command takes down the netlink between the fcauthd and the lpfc driver, and stop the fcauthd daemon.
- reload - The reload command reloads the authentication configuration database into memory. This is done whenever the database is changed by another application (HBAnyware) or by the user. If the database is changed the new configuration information is not used until the fcauthd daemon reloads the database.
- status - This command is used to display the current status of the fcauthd. The status should be either "running" or "stopped".
- restart - The restart command performs a "stop" and then a "start".
- condrestart - The conditional restart command checks the status of the fcauthd daemon. If it is running it issues a "stop" and then a "start" command. If the fcauthd daemon is not running nothing happens.

Authentication Configuration Parameters

You can configure each port's authentication parameters using the HBAnyware 3.4 configuration utility. Refer to the HBAnyware 3.4 User Manual to learn how.

Setting Remote and Local Passwords

You can configure each port's password using the HBAnyware 3.4 configuration utility. Refer to the HBAnyware 3.4 User Manual to learn how.

Troubleshooting

Introduction

There are several circumstances in which your system may operate in an unexpected manner. The Troubleshooting section explains many of these circumstances and offers one or more workarounds for each situation.

Unusual Situations and their Resolutions

General Situations

Table 6: General Driver Situations

Situation	Resolution
FC link fails to come up.	If an FC link fails to come up, verify that an 8-Gb HBA is not attempting to connect to a 1-Gb device. Only 2-Gb, 4-Gb and 8-Gb devices are supported on 8-Gb HBAs.
Error states "Authentication is enabled but authentication service is not running."	If you see this message in /var/log/messages and the HBA is in an "Error" state, the fcauthd daemon probably is not running. To check if fcauthd is running execute /etc/init.d/fcauthd status. To start fcauthd execute /etc/init.d/fcauthd start.
If a SAN configuration has 256 targets mapped by the lpfc driver, any additional added targets do not get a target ID mapping by the driver and cause target discovery to fail. Removing targets or reinitializing the link does not solve the problem.	Unload and reload the driver to reset available target IDs. Ensure that the SAN configuration is correct prior to rebooting the driver. This will clear the driver's consistent binding table and free target IDs for new target nodes.
In some cases, after loading an OEM supplied combined firmware/OpenBoot image you will not be able to enable BootBIOS from the lputil Boot BIOS Maintenance menu. Should you encounter this problem after loading the OEM combined firmware/ OpenBoot image, follow the steps outlined in the resolution.	1. Download the current OpenBoot only image for your adapter from the Emulex Web site. 2. Load the current OpenBoot only image following steps listed in Updating BootBIOS section of this manual. 3. Run lputil, return to Boot BIOS Maintenance menu. 4. Enable BootBIOS.
rmmod fails to unload lpfc driver module due to ERROR: Module lpfc is in use. This message can appear when you attempt to remove the driver and there is a Logical Volume Group dependent on the driver.	1. Make the Logical Volume Group unavailable. Type: lvchange -a n xxxxxxx where xxxxxx is the Volume Group Name. 2. Stop HBAnyware. 3. Stop Device Mapper.

Table 6: General Driver Situations (Continued)

Situation	Resolution
rmmod of lpfc driver hangs and module reference count is 0.	Due to a small race condition in the kernel it is possible for an rmmod command to hang. Issue the `rmmod -w` command. If this does not help, reboot the computer.
rmmod fails to unload driver due to Device or resource busy. This message occurs when you attempt to remove the driver without first stopping the HBAnyware utility or the fcauthd daemon, when the HBAnyware utility is installed and running or when FC disks connected to a LightPulse HBA are mounted.	Stop the HBAnyware utility before attempting to unload the driver. The script is located in the /usr/sbin/hbanyware directory. Type: ./stop_hbanyware Unmount any disks connected to the HBA. Unload the driver. Type: rmmod lpfcdfc Type: rmmod lpfc
An lspci will show recent Emulex HBAs as "unknown". This is because of the delay of getting new product ID's into the Linux development cycle.	None at this time.
Slow targets or extended link faults on the storage side may result in storage being marked off-line by the mid-layer and remaining off-line (not recovered) when the link faults are corrected.	This version of the driver should eliminate this problem. However, should you experience off-line device issues, increase the SCSI command timeout to a value greater than or equal to sixty seconds. Emulex also provides a script which addresses this issue (for 2.6 kernels). To access the lun_change_state.sh script, click http://www.emulex.com/support/linux/index.jsp, then click the link to the appropriate driver, and click the Linux tools link.
Under certain conditions of an I/O load, some targets cannot retire an I/O issued by a Linux initiator within the default timeout of 30 seconds given by the scsi midlayer. If the situation is not corrected, the initiator-to-target condition deteriorates into abort/recovery storms leading to I/O failures in the block layer. These types of failures are preceded by a SCSI IO error of hex 6000000.	Emulex provides a script which addresses this issue. To access the set_target_timeout.sh script, click http://www.emulex.com/support/linux/index.jsp, then click the link to the appropriate driver, and click the Linux tools link.
lpfc driver fails to recognize an HBA and logs "unknown IOCB" messages in the system log during driver load. The HBA is running outdated firmware.	Upgrade HBA firmware to minimum supported revision listed in installation guide (or newer).
Loading the lpfc driver on SLES 10 reports "unsupported module, tainting kernel" in system log.	This message is logged by the kernel whenever a module which is not shipped with the kernel is loaded. This message can be ignored.
System panics when booted with a failed HBA installed.	Remove the failed HBA and reboot.
lpfc driver unload on SLES 10 causes messages like the following to be logged in the system log: "umount: /dev/disk/bypath/pci-0000:02:04.0-scsi-0:0:1:0: not mounted"	These messages are normal output from the SLES 10 hotplug scripts and can be safely ignored.

Table 6: General Driver Situations (Continued)

Situation	Resolution
Driver Install Fails. The lpfc-install script fails to install the driver.	The install script may fail for the following reasons: • A previous version of the driver is installed. Run the lpfc-install --uninstall script and then try to install the driver. • The current driver is already installed. • The kernel source does not match the standard kernel name or you are running a custom kernel. • Use rpm -e lpfcdriver and -e hbanyware and install the new kits.
"No module lpfc found for kernel" error message. When upgrading the kernel, rpm generates the following error: "No module lpfc found for kernel KERNELVERSION". **A recently upgraded kernel cannot find the ramdisk.** After upgrading the kernel, the kernel cannot find the ramdisk which halts or panics the system. **The driver is not loaded after a system reboot after upgrading the kernel.**	These three situations may be resolved by upgrading the kernel. There are two ways to install the driver into an upgraded kernel. The method you use depends on whether or not you are upgrading the driver. • Upgrade the kernel using the same version of the driver. • Upgrade the kernel using a new version of the driver. See the Installation section for these procedures.
Driver uninstall fails. The lpfc-install --uninstall script fails with an error.	Try the following solutions: • Uninstall the HBAnyware and SSC software packages. These can be removed by running the ./uninstall script from the HBAnyware installation directory. • Unmount all FC disk drives. • Unload the lpfcdfc and lpfc driver. • Use rpm -e lpfcdriver and -e hbanyware and uninstall the new kits.
lpfc-install script exit code.	The lpfc-install script contains exit codes that can be useful in diagnosing installation problems. See the lpfc-install script for a complete listing of codes and definitions.
The HBAnyware software package will not install. An error message states that: "inserv Service Elxlpfc has to be enabled for service ElxDiscSrvinserv: exiting now/sbin/ inserv failed exit code 1."	Reinstall the driver with the lpfc-install script.

Table 6: General Driver Situations (Continued)

Situation	Resolution
The Emulex driver for Linux does not load in ramdisk for a custom built kernel.	Custom built kernels are not supported by Emulex. However, the Emulex install script will attempt to install the driver into a ramdisk that follows the naming scheme used by Red Hat or SLES kernels. • The SLES naming scheme for IA64 ramdisk images is: /boot/efi/efi/suse/initrd. • The SLES naming scheme for ramdisk images on all other architectures is: /boot/initrd. If a custom built kernel has a ramdisk image that does not follow the appropriate naming scheme, the name of the image can be changed using the following procedure: 1. Change the name of the ramdisk image to match the SLES naming scheme. 2. Update any file links to the ramdisk image. 3. Edit the boot loader configuration file: (i.e., /etc/lilo.conf, /etc/yaboot.conf, /boot/grub/grub.conf, /boot/grub/menu.lst), find any references to the old ramdisk image name, and replace them with the new name. 4. Reboot the system to verify the changes. 5. Install the Emulex lpfc Linux driver kit.
The Linux SCSI subsystem only sees 8 LUNs when more are present.	Some SCSI drivers will not scan past 8 LUNs when the target reports as a SCSI-2 device. Force SCSI bus scan with /usr/sbin/ lpfc/lun_scan. SuSE supplies /bin/rescan-scsi-bus.sh which can be changed to scan everything.
Cannot See Multiple Zones from the Management Server. Cannot see multiple zones on the same screen of my management server running the HBAnyware utility.	Provide a physical Fibre Channel connection into each of the zones. For each zone you want to see, connect an Emulex HBAnyware utility enabled port into that zone. Use Out-of-Band discovery, Ethernet, to connect to the undiscovered server.

lpfc Log Messages

Introducton

Log messages are organized into logical groups based on code functionality within the Fibre Channel driver. Each group consists of a block of 100 log message numbers. Most groups require a single block of 100 message numbers, however some groups (INIT, FCP) require two blocks.

The groups and the associated number ranges are defined in the Message Log table below.

Table 7: Message Log Table

LOG Message Verbose Mask Definition	From	To	Verbose Bit	Verbose Description
LOG_ELS	0100	0199	0x1	ELS events
LOG_DISCOVERY	0200	0299	0x2	Link discovery events
LOG_SLI	0300	0399	0x800	SLI events
LOG_MBOX	0300	0339	0x4	Mailbox events
LOG_TEMP	0340	0347	0x100	Temperature sensor events
LOG_INIT	0400	0499	0x8	Initialization events
Reserved	0500	0599		
LOG_IP	0600	0699	0x20	IPFC events
LOG_FCP	0700	0799	0x40	FCP traffic history
Reserved	0800	0899		
LOG_NODE	0900	0999	0x80	Node table events
LOG_SECURITY	1000	1099	0x8000	FC Security
Reserved	1100	1199		
LOG_MISC	1200	1299	0x400	Miscellaneous events
LOG_LINK_EVENT	1300	1399	0x10	Link events
Reserved	1400	1499		
Reserved	1500	1599		
LOG_LIBDFC	1600	1699	0x2000	IOCTL events

Table 7: Message Log Table (Continued)

LOG Message Verbose Mask Definition	From	To	Verbose Bit	Verbose Description
LOG_VPORT	1800	1832	0x4000	NPIV events
LOG_ALL_MSG	0100	1699	0xffff	Log all messages

Message Log Example

The following is an example of a LOG message:

```
Jul  2 04:23:34 daffy kernel: lpfc 0000:03:06.0: 0:1305 Link Down
Event x2f2 received Data: x2f2 x20 x110
```

In the above LOG message:

- lpfc 0000:03:06.0: identifies the identifies the pci location of the particular lpfc hw port.
- 0: identifies Emulex HBA0.
- 1305 identifies the LOG message number.

Note: If the word 'Data:' is present in a LOG message, any information to the right of 'Data:' is intended for Emulex technical support/engineering use only.

ELS Events (0100 - 0199)

elx_mes0100: FLOGI failure

DESCRIPTION: An ELS FLOGI command that was sent to the fabric failed.
DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpTimeout
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0101: FLOGI completes successfully

DESCRIPTION: An ELS FLOGI command that was sent to the fabric succeeded.
DATA: (1) ulpWord[4] (2) e_d_tov (3) r_a_tov (4) edtovResolution
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0102: PLOGI completes to NPort <nlp_DID>

DESCRIPTION: The HBA performed a PLOGI into a remote NPort.
DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpTimeout (4)disc (5) num_disc_nodes
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0103: PRLI completes to NPort <nlp_DID>

DESCRIPTION: The HBA performed a PRLI into a remote NPort.
DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpTimeout (4) num_disc_nodes
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0104: ADISC completes to NPort <nlp_DID>

DESCRIPTION: The HBA performed a ADISC into a remote NPort.
DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpTimeout (4) disc (5) num_disc_nodes
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0105: LOGO completes to NPort <nlp_DID>

DESCRIPTION: The HBA performed a LOGO to a remote NPort.
DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpTimeout (4) num_disc_nodes
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0106: ELS cmd tag <ulpIoTag> completes

DESCRIPTION: The specific ELS command was completed by the firmware.
DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpTimeout
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0107: Retry ELS command <elsCmd> to remote NPORT <did>

DESCRIPTION: The driver is retrying the specific ELS command.
DATA: (1) retry (2) delay
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0108: No retry ELS command <elsCmd> to remote NPORT <did>

DESCRIPTION: The driver decided not to retry the specific ELS command that failed.
DATA: (1) retry
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0109: ACC to LOGO completes to NPort <nlp_DID>

DESCRIPTION: The driver received a LOGO from a remote NPort and successfully issued an ACC response.
DATA: (1) nlp_flag (2) nlp_state (3) nlp_rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0110: ELS response tag <ulpIoTag> completes

DESCRIPTION: The specific ELS response was completed by the firmware.
DATA: (1) ulpStatus (2) ulpWord[4] (3) nlp_DID (4) nlp_flag (5) nlp_state (6) nlp_rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0111: Dropping received ELS cmd

DESCRIPTION: The driver decided to drop an ELS Response ring entry.
DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpTimeout
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver or firmware problem. If problems persist report these errors to Technical Support.

elx_mes0112: ELS command <elsCmd> received from NPORT <did>

DESCRIPTION: Received the specific ELS command from a remote NPort.
DATA: (1) hba_state
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0113: An FLOGI ELS command <elsCmd> was received from DID <did> in Loop Mode

DESCRIPTION: While in Loop Mode an unknown or unsupported ELS command was received.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: Check device DID.

elx_mes0114: PLOGI chkparm OK

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.
DATA: (1) nlp_DID (2) nlp_state (3) nlp_flag (4) nlp_Rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0115: Unknown ELS command <elsCmd> received from NPORT <did>

DESCRIPTION: Received an unsupported ELS command from a remote NPORT.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: Check remote NPORT for potential problem.

elx_mes0116: Xmit ELS command <elsCmd> to remote NPORT <did>

DESCRIPTION: Xmit ELS command to remote NPORT.
DATA: (1) icmd->ulpIoTag (2) hba_state
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0117: Xmit ELS response <elsCmd> to remote NPORT <did>

DESCRIPTION: Xmit ELS response to remote NPORT.
DATA: (1) icmd->ulpIoTag (2) size
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0118: Xmit ELS RPS ACC response tag <ulpIoTag>

DESCRIPTION: An RPS ACC response for the specified IO tag has been sent.
DATA:(1) ulpContext (2) nlp_DID (3) nlp_flag (4) nlp_state (5) nlp_rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: None required.

elx_mes0119: Issue GEN REQ IOCB for NPORT <ulpWord[5]>

DESCRIPTION: Issue a GEN REQ IOCB for remote NPORT. These are typically used for CT request.
DATA: (1) ulpIoTag (2) hba_state
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0120: Xmit ELS RPL ACC response tag <ulpIoTag>

DESCRIPTION: An RPL ACC response for the specified IO tag has been sent.
DATA:(1) ulpContext (2) nlp_DID (3) nlp_flag (4) nlp_state (5) nlp_rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: None required

elx_mes0121: PLOGI chkparm OK

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.
DATA: (1) nlp_DID (2) nlp_state (3) nlp_flag (4) nlp_Rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0125: FDISC Failed (x%x). Fabric out of resources

DESCRIPTION: The fabric rejected an FDISC because the switch can not support any more Virtual ports..
DATA: lsRjtError
SEVERITY: Error
LOG: Always
ACTION: Reconfigure the switch to support more NPIV loggins. If problem persists, contact Technical Support.

elx_mes0127: ELS timeout

DESCRIPTION: An ELS IOCB command was posted to a ring and did not complete within ULP timeout seconds.
DATA: (1) elscmd (2) remote_id (3) ulpcommand (4) ulpIoTag
SEVERITY: Error
LOG: Always
ACTION: If no ELS command is going through the adapter, reboot the system; If problem persists, contact Technical Support.

elx_mes0128 - Xmit ELS ACC response tag <ulpIoTag>

DESCRIPTION: An ELS accept response for the specified IO tag has been sent.
DATA: (1) ulpContext (2) nlp_DID (3) nlp_flag (4) nlp_state (5) nlp_rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0129 - Xmit ELS RJT <rejectError> response tag <ulpIoTag>

DESCRIPTION: An ELS reject response with the specified error for the specified IO tag has been sent.
DATA: (1) ulpContext (2) nlp_DID (3) nlp_flag (4) nlp_state (5) nlp_rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0130 - Xmit ADISC ACC response tag <ulpIoTag>

DESCRIPTION: An ADISC ACC response for the specified IO tag has been sent.
DATA: (1) ulpContext (2) nlp_DID (3) nlp_flag (4) nlp_state (5) nlp_rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0131 - Xmit PRLI ACC response tag <ulpIoTag>

DESCRIPTION: A PRLI ACC response for the specified IO tag has been sent.
DATA: (1) ulpContext (2) nlp_DID (3) nlp_flag (4) nlp_state (5) nlp_rpi
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

elx_mes0132 - Xmit RNID ACC response tag <ulpIoTag>

DESCRIPTION: A RNID ACC response for the specified IO tag has been sent.
DATA: (1) ulpContext
SEVERITY: Information
LOG: LOG_ELS verbose
ACTION: No action needed, informational.

Link Discovery Events (0200 - 0299)

elx_mes0200: CONFIG_LINK bad hba state <hba_state>

DESCRIPTION: A CONFIG_LINK mbox command completed and the driver was not in the right state.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes0202: Start Discovery hba state <hba_state>

DESCRIPTION: Device discovery / rediscovery after FLOGI, FAN or RSCN has started.
DATA: (1) fc_flag (2) fc_plogi_cnt (3) fc_adisc_cnt
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0203: Devloss timeout on WWPN <address> NPort <nlp_DID>

DESCRIPTION: A remote NPort that was discovered by the driver disappeared for more than lpfc_devloss_tmo seconds.
DATA: (1) nlp_flag (2) nlp_state (3) nlp_rpi
SEVERITY: Error
LOG: Always
ACTION: If the device generating this message is not a target to which the HBA is connected, this error will not affect the data integrity of the I/O between the HBA and the attached storage and can be ignored.

elx_mes0204:Devloss timeout on WWPN <address> NPort <nlp_DID>

DESCRIPTION: A remote NPort that was discovered by the driver disappeared for more than lpfc_devloss_tmo seconds.
DATA: (1) nlp_flag (2) nlp_state (3) nlp_rpi
SEVERITY: Informational
LOG: LOG_DISCOVERY verbose
ACTION: If the device generating this message is not a target to which the HBA is connected, this error will not affect the data integrity of the I/O between the HBA and the attached storage and can be ignored.

elx_mes0205: Abort outstanding I/O on NPort <Fabric_DID>

DESCRIPTION: All outstanding I/Os are cleaned up on the specified remote NPort.
DATA: (1) nlp_flag (2) nlp_state (3) nlp_rpi
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0206: Device discovery completion error

DESCRIPTION: This indicates that an uncorrectable error was encountered during device (re)discovery after a link up. Fibre Channel devices will not be accessible if this message is displayed.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: Reboot the system. If the problem persists, report the error to Technical Support. Run with verbose mode on for more details.

elx_mes0207: Device <DID> (<WWN>) sent invalid service parameters. Ignoring device.

DESCRIPTION: Invalid service parameters were received from DID. Ignoring this remote port.
DATA: DID, WWN
SEVERITY: Error
LOG: Always
ACTION: Verify the remote port's configuration. If the problem persists, report the error to Technical Support. Run with verbose mode on for more details.

elx_mes0208: Skip <Did> NameServer Rsp

DESCRIPTION: The driver received a NameServer response.
DATA: (1) size (2) fc_flag (3) fc_rscn_id_cnt
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0209: CT request completes <ulpStatus> <ulpStatus> <CmdRsp> <CmdRsp>

DESCRIPTION: A RFT request that was sent to the fabric completed.
DATA: latt, ulpStatus, CmdRsp, Context, Tag
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0210: Continue discovery with <num_disc_nodes> ADISCs to go

DESCRIPTION: A device discovery is in progress.
DATA: (1) fc_adisc_cnt (2) fc_flag (3) phba->hba_state
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0211: DSM in event <evt> on NPort <nlp_DID> in state <cur_state>

DESCRIPTION: The driver Discovery State Machine is processing an event.
DATA: (1) nlp_flag
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION:No action needed, informational.

elx_mes0212: DSM out state <rc> on NPort <nlp_DID>

DESCRIPTION: The driver Discovery State Machine completed processing an event.
DATA: (1) nlp_flag
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0214: RSCN received

DESCRIPTION: An RSCN ELS command was received from a fabric.
DATA: (1) fc_flag (2) payload_len (3) *lp (4) fc_rscn_id_cnt
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0215: RSCN processed

DESCRIPTION: An RSCN ELS command was received from a fabric and processed.
DATA: (1) fc_flag (2) cnt (3) fc_rscn_id_cnt (4) hba_state
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION:No action needed, informational.

elx_mes0217: Unknown Identifier in RSCN payload

DESCRIPTION: Typically the identifier in the RSCN payload specifies a domain, area or a specific NportID. If neither of these are specified, a warning will be recorded.
DATA: (1) un.word
SEVERITY: Error
LOG: Always
ACTION: Potential problem with Fabric. Check with Fabric vendor.

elx_mes0218: FDMI Request

DESCRIPTION: The driver is sending an FDMI request to the fabric.
DATA: (1) fc_flag (2) hba_state (3) cmdcode
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0220: FDMI rsp failed

DESCRIPTION: An error response was received to FDMI request.
DATA:(1) SWAP_DATA16(fdmi_cmd)
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: The fabric does not support FDMI, check fabric configuration.

elx_mes0221: FAN timeout

DESCRIPTION: A link up event was received without the login bit set, so the driver waits E_D_TOV for the Fabric to send a FAN. If no FAN if received, a FLOGI will be sent after the timeout.
DATA: None
SEVERITY: Warning
LOG: LOG_DISCOVERY verbose
ACTION: None required. The driver recovers from this condition by issuing a FLOGI to the fabric.

elx_mes0222: Initial FLOG/FDISKI timeout

DESCRIPTION: The driver sent the initial FLOGI or FDISK to the fabric and never got a response back.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: Check Fabric configuration. The driver recovers from this and continues with device discovery.

elx_mes0223: Timeout while waiting for NameServer login

DESCRIPTION: Our login request to the NameServer was not acknowledged within RATOV.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: Check the fabric configuration. The driver recovers from this and continues with device discovery.

elx_mes0224: NameServer Query timeout

DESCRIPTION: Node authentication timeout, node Discovery timeout. A NameServer Query to the Fabric or discovery of reported remote NPorts is not acknowledged within R_A_TOV.
DATA: (1) fc_ns_retry (2) fc_max_ns_retry
SEVERITY: Error
LOG: Always
ACTION: Check Fabric configuration. The driver recovers from this and continues with device discovery.

elx_mes0225: Device Discovery completes

DESCRIPTION: This indicates successful completion of device (re)discovery after a link up.
DATA: None
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0226: Device discovery completion error

DESCRIPTION: This indicates that an uncorrectable error was encountered during device (re)discovery after a link up. Fibre Channel devices will not be accessible if this message is displayed.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: Reboot the system. If the problem persists, report the error to Technical Support. Run with verbose mode on for more details.

elx_mes0227: Node Authentication timeout

DESCRIPTION: The driver has lost track of what NPORTs are being authenticated.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: None required. The driver should recover from this event.

elx_mes0228: CLEAR LA timeout

DESCRIPTION: The driver issued a CLEAR_LA that never completed.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: None required. The driver should recover from this event.

elx_mes0231: RSCN timeout

DESCRIPTION: The driver has lost track of what NPORTs have RSCNs pending.
DATA: (1) fc_ns_retry (2) lpfc_max_ns_retry
SEVERITY: Error
LOG: Always
ACTION: None required. The driver should recover from this event.

elx_mes0232: Continue discovery with <num_disc_nodes> PLOGIs to go

DESCRIPTION: Device discovery is in progress.
DATA: (1) fc_plogi_cnt (2) fc_flag (3) phba->hba_state
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0234: ReDiscovery RSCN

DESCRIPTION: The number / type of RSCNs has forced the driver to go to the nameserver and re-discover all NPORTs.
DATA: (1) fc_rscn_id_cnt (2) fc_flag (3) hba_state
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0235: Deferred RSCN

DESCRIPTION: The driver has received multiple RSCNs and has deferred the processing of the most recent RSCN.
DATA: (1) fc_rscn_id_cnt (2) fc_flag (3) hba_state
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0236: NameServer req

DESCRIPTION: The driver is issuing a NameServer request to the fabric.
DATA: (1) cmdcode (2) fc_flag (3) fc_rscn_id_cnt
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0237: Pending Link Event during Discovery: State <hba_state>

DESCRIPTION: Received link event during discovery. Causes discovery restart.
DATA: None
SEVERITY: Warning
LOG: LOG_DISCOVERY verbose
ACTION: None required unless problem persists. If persistent check cabling.

elx_mes0238: Process <Did> NameServer Rsp

DESCRIPTION: The driver received a NameServer response.
DATA: (1) nlp_flag (2) fc_flag (3) fc_rscn_id_cnt
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0240: NameServer Rsp Error

DESCRIPTION: The driver received a NameServer response containing a status error.
DATA: (1) CommandResponse.bits.CmdRsp (2) ReasonCode (3) Explanation (4) fc_flag
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: Check the fabric configuration. The driver recovers from this and continues with device discovery.

elx_mes0241: NameServer rsp error

DESCRIPTION: The driver received a NameServer response containing a status error.
DATA: (1) CommandResponse.bits.CmdRsp (2) ReasonCode (3) Explanation (4) fc_flag
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: Check the fabric configuration. The driver recovers from this and continues with device discovery.

elx_mes0244: Issue FDMI request failed

DESCRIPTION: Cannot issue an FDMI request to the HBA.
DATA: (1) cmdcode
SEVERITY: Information
LOG: LOG_Discovery verbose
ACTION: No action needed, informational.

elx_mes0246: RegLogin failed

DESCRIPTION: The firmware returned a failure for the specified RegLogin.
DATA: Did, mbxStatus, hbaState
SEVERITY: Error
LOG: Always
ACTION: This message indicates that the firmware could not do RegLogin for the specified Did. There may be a limitation on how many nodes an HBA can see.

elx_mes0247: Start Discovery Timer state <hba_state>

DESCRIPTION: Start the device discovery / RSCN rescue timer.
DATA: (1) tmo (2) fc_disctmo (3) fc_plogi_cnt (4) fc_adisc_cnt
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION: No action needed, informational.

elx_mes0248: Cancel Discovery Timer state <hba_state>

DESCRIPTION: Cancel the device discovery / RSCN rescue timer.
DATA: (1) fc_flag (2) fc_plogi_cnt (3) fc_adisc_cnt
SEVERITY: Information
LOG: LOG_DISCOVERY verbose
ACTION:No action needed, informational.

elx_mes0253 - Illegal State Transition: node <nlp_DID> event <evt>, state <nlp_state>

DESCRIPTION: An unexpected response was received from the specified node.
DATA: (1) nlp_rpi (2) nlp_flag
SEVERITY: Error
LOG: Always
ACTION: Check connection to fabric and/or remove device. If problem persists, please report the issue to Technical Support.

Mailbox Events (0300 - 0339)

elx_mes0300: READ_LA: no buffers

DESCRIPTION: The driver attempted to issue a READ_LA mailbox command to the HBA, but there were no buffers available.
DATA: None
SEVERITY: Warning
LOG: LOG_MBOX verbose
ACTION: This message indicates: (1) Kernel virtual memory is depleted. Check that the system meets minimum RAM requirements for the Emulex Fibre Channel adapter. Try closing other applications to free some memory. (2) A possible driver buffer management problem. If this problem persists, report the error to Technical Support.

elx_mes0301: READ_SPARAM: no buffers

DESCRIPTION: The driver attempted to issue a READ_SPARAM mailbox command to the HBA, but there were no buffers available.
DATA: None
SEVERITY: Warning
LOG: LOG_MBOX verbose
ACTION: This message indicates: (1) Kernel virtual memory is depleted. Check that the system meets minimum RAM requirements for the Emulex Fibre Channel adapter. Try closing other applications to free some memory. (2) A possible driver buffer management problem. If the problem persists, report the error to Technical Support.

elx_mes0302: REG_LOGIN: no buffers

DESCRIPTION: The driver attempted to issue a REG_LOGIN mailbox command to the HBA, but there were no buffers available.
DATA: (1) Did (2) flag
SEVERITY: Warning
LOG: LOG_MBOX verbose
ACTION: This message indicates: (1) Kernel virtual memory is depleted. Check that the system meets minimum RAM requirements for the Emulex Fibre Channel adapter. Try closing other applications to free some memory. (2) A possible driver buffer management problem. If the problem persists, report the error to Technical Support.

elx_mes0303: Ring <ringno> handler: portRspPut <portRspPut> is bigger then rsp ring <portRspMax>

DESCRIPTION: The port rsp ring put index is larger than the size of the rsp ring.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

elx_mes0304: Stray mailbox interrupt, mbxCommand <mbxcommand> mbxStatus <mbxstatus>

DESCRIPTION: Received a mailbox completion interrupt and there are no outstanding mailbox commands.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0305: Mbox cmd cmpl error - RETRYing

DESCRIPTION: A mailbox command completed with an error status that causes the driver to reissue the mailbox command.
DATA: (1) mbxCommand (2) mbxStatus (3) un.varWords[0] (4) hba_state
SEVERITY: Information
LOG: LOG_MBOX verbose, LOG_SLI verbose
ACTION: No action needed, informational.

elx_mes0306: CONFIG_LINK mbxStatus error <mbxStatus> HBA state <hba_state>

DESCRIPTION: The driver issued a CONFIG_LINK mbox command to the HBA that failed.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a firmware or hardware problem. Report these errors to Technical Support.

elx_mes0307: Mailbox cmd <mbxCommand> Cmpl <mbox_cmpl>

DESCRIPTION: A mailbox command completed.
DATA: (1) pmbox (2) varWords[0], (3) varWords[1], (4) varWords[2], (5) varWords[3], (6) varWords[4], (7) varWords[5], (8) varWords[6], (9) varWords[7]
SEVERITY: Information
LOG: LOG_MBOX verbose, LOG_SLI verbose
ACTION: No action needed, informational.

elx_mes0308: Mbox cmd issue - BUSY

DESCRIPTION: The driver attempted to issue a mailbox command while the mailbox was busy processing the previous command. The processing of the new command will be deferred until the mailbox becomes available.
DATA: (1) mbxCommand (2) hba_state (3) sli_flag (4) flag
SEVERITY: Information
LOG: LOG_MBOX verbose, LOG_SLI verbose
ACTION: No action needed, informational.

elx_mes0309: Mailbox cmd <mbxcommand> issue

DESCRIPTION: The driver is in the process of issuing a mailbox command.
DATA: (1) hba_state (2) sli_flag (3) flag
SEVERITY: Information
LOG: LOG_MBOX verbose, LOG_SLI verbose
ACTION: No action needed, informational.

elx_mes0310: Mailbox command <mbxcommand> timeout

DESCRIPTION: A mailbox command was posted to the adapter and did not complete within 30 seconds.
DATA: (1) hba_state (2) sli_flag (3) mbox_active
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver or firmware problem. If no I/O is going through the adapter, reboot the system. If the problem persists, report the error to Technical Support.

elx_mes0311: Mailbox command <mbxcommand> cannot issue

DESCRIPTION: The driver is in the wrong state to issue the specified command.
DATA: (1) hba_state (2) sli_flag (3) flag
SEVERITY: Information
LOG: LOG_MBOX verbose, LOG_SLI verbose
ACTION: No action needed, informational.

elx_mes0313: Ring <ringno> handler: unexpected Rctl <Rctl> Type <Type> received

DESCRIPTION:The Rctl/Type of a received frame did not match any for the configured masks for the specified ring.
DATA: None
SEVERITY: Warning
LOG: LOG_SLI verbose
ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

elx_mes0315: Ring <ringno> issue: portCmdGet <local_getidx> is bigger then cmd ring <max_cmd_idx>

DESCRIPTION: The port cmd ring get index is greater than the size of cmd ring.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

elx_mes0317: iotag <ulp_IoTag> is out of range: max iotag <max_iotag> wd0 <wd0>

DESCRIPTION: The IoTag in the completed IOCB is out of range.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

elx_mes0318: Failed to allocate IOTAG. last IOTAG is <last_allocated_iotag>

DESCRIPTION: The driver cannot allocate an IoTag. Display the last value used.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This message indicates the adapter HBA I/O queue is full. Typically this happens when heavy I/O is running on a low-end (3 digit) adapter. We suggest you upgrade to a higher-end adapter.

elx_mes0319: READ_SPARAM mbxStatus error <mbxStatus> hba state <hba_state>

DESCRIPTION: The driver issued a READ_SPARAM mbox command to the HBA that failed.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a firmware or hardware problem. Report these errors to Technical Support.

elx_mes0320: CLEAR_LA mbxStatus error <mbxStatus> hba state <hba_state>

DESCRIPTION: The driver issued a CLEAR_LA mbox command to the HBA that failed.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a firmware or hardware problem. Report these errors to Technical Support.

elx_mes0321: Unknown IOCB command

DESCRIPTION: Received an unknown IOCB command completion.
DATA: (1) type (2) ulpCommand (3) ulpStatus (4) ulpIoTag (5) ulpContext)
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver or firmware problem. If these problems persist, report these errors to Technical Support

elx_mes0322: Ring <ringno> handler: unexpected completion IoTag <IoTag>

DESCRIPTION:The driver could not find a matching command for the completion received on the specified ring.
DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpCommand (4) ulpContext
SEVERITY: Warning
LOG: LOG_SLI verbose
ACTION:This error could indicate a software driver or firmware problem. If problems persist report these errors to Technical Support.

elx_mes0323: Unknown Mailbox command <mbxCommand> Cmpl

DESCRIPTION: A unknown mailbox command completed.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

elx_mes0324: Config port initialization error, mbxCmd <mbxCommand> READ_NVPARM, mbxStatus <mbxStatus>

DESCRIPTION: A read nvparams mailbox command failed during port configuration.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

elx_mes0325 - Reset HBA

DESCRIPTION: An HBA has been reset.
DATA: (1) hba_state (2) sli_flag
SEVERITY: Information
LOG: LOG_SLI verbose
ACTION: No action needed, informational.

elx_mes0330: IOCB wake NOT set

DESCRIPTION: The completion handler associated with the IOCB was never called.
DATA:(1) timeout (2) timeleft/jiffies
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver, firmware or hardware problem. If the problem persists, report the error to Technical Support.

elx_mes0331: IOCB wake signaled

DESCRIPTION: The IOCB completed successfully.
DATA: None
SEVERITY: Information
LOG: LOG_SLI verbose
ACTION: None required.

elx_mes0332: IOCB wait issue failed

DESCRIPTION: The lpfc driver failed to issue an IOCB.
DATA:(1) retval
SEVERITY: Information
LOG: LOG_SLI verbose
ACTION: None required.

elx_mes0334: Unknown IOCB command

DESCRIPTION: Received an unknown IOCB command completion.
DATA: (1) type (2) ulpCommand (3) ulpStatus (4) ulpIoTag (5) ulpContext)
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver or firmware problem. If these problems persist, report these errors to Technical Support.

elx_mes0335: Unknown IOCB command

DESCRIPTION: Received an unknown IOCB command completion.
DATA: (1) ulpCommand (2) ulpStatus (3) ulpIoTag (4) ulpContext)
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver or firmware problem. If these problems persist, report these errors to Technical Support

elx_mes0336 - Rsp Ring <ringno> error: IOCB

DESCRIPTION: An IOCB error has occurred on the specified ring.
DATA: (1) ulpWord[0] (2) ulpWord[1] (3) ulpWord[2] (4) ulpWord[3] (5) ulpWord[4] (6) ulpWord[5] (7) irsp+6 (8) irsp+7
SEVERITY: Warning
LOG: LOG_SLI verbose
ACTION: If the problem persists, check the targets. If the targets are okay, report the error to Technical Support.

elx_mes0337 - Rsp Ring <ringno> error: IOCB

DESCRIPTION: An IOCB error has occurred on the specified ring.
DATA: (1) ulpWord[0] (2) ulpWord[1] (3) ulpWord[2] (4) ulpWord[3] (5) ulpWord[4] (6) ulpWord[5] (7) irsp+6 (8) irsp+7
SEVERITY: Warning
LOG: LOG_SLI verbose
ACTION: If the problem persists, check the targets. If the targets are functioning properly, report the error to Technical Support.

elx_mes0338: Kill HBA

DESCRIPTION: The driver is sending a Kill Board mailbox command to the FW.
DATA:(1) hba_state (2) sli_flag
SEVERITY: Informational
LOG: LOG_SLI verbose
ACTION: No action needed. Informational.

Temperature Events (0340 - 0347)

elx_mes0340: Adapter temperature is OK now.

DESCRIPTION: Adapter temperature has reverted to normal range.
DATA: Temperature in Celsius
SEVERITY: Error
LOG: LOG_TEMP verbose
ACTION: No action needed, informational.

elx_mes0347: Adapter is very hot, please take corrective action.

DESCRIPTION: Adapter temperature is above normal range
DATA: Temperature in Celsius
SEVERITY: Error
LOG: LOG_TEMP verbose
ACTION: Shutdown and remove the HBA. Contact customer support.

Initialization Events (0400 - 0499)

elx_mes0405: Service Level Interface (SLI) 2 selected

DESCRIPTION: A CONFIG_PORT (SLI2) mailbox command was issued.
DATA: None
SEVERITY: Information
LOG: LOG_INIT verbose
ACTION: No action needed, informational.

elx_mes0410: Cannot find virtual addr for mapped buf on ring <ringno>

DESCRIPTION: The driver cannot find the specified buffer in its mapping table. Thus it cannot find the virtual address needed to access the data.
DATA: (1) phys (2) next (3) prev (4) postbufq_cnt
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver or firmware problem. If the problem persists report these errors to Technical Support.

elx_mes0436: Adapter failed to init, timeout, status reg <status>

DESCRIPTION: The adapter failed during powerup diagnostics after it was reset.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0437: Adapter failed to init, chipset, status reg <status>

DESCRIPTION: The adapter failed during powerup diagnostics after it was reset.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0438: Adapter failed to init, chipset, status reg <status>

DESCRIPTION: The adapter failed during powerup diagnostics after it was reset.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0439: Adapter failed to init, mbxCmd <mbxCommand> READ_REV, mbxStatus <mbxStatus>

DESCRIPTION: Adapter initialization failed when issuing a READ_REV mailbox command.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0440: elx_mes0440: Adapter failed to init, READ_REV has missing revision information

DESCRIPTION: A firwmare revision intialization error was detected.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. Update the firmware. If the problem persists, report the error to Technical Support.

elx_mes0441: VPD not present on adapter, mbxCmd <mbxCommand> DUMP VPD, mbxStatus <mbxStatus>

DESCRIPTION: The DUMP_VPD mailbox command failed.
DATA: None
SEVERITY: Information
LOG: LOG_INIT verbose
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0442: Adapter failed to init, mbxCmd <mbxCommand> CONFIG_PORT, mbxStatus <mbxStatus>

DESCRIPTION: Adapter initialization failed when issuing a CONFIG_PORT mailbox command.
DATA: (1) hbainit
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0446: Adapter failed to init, mbxCmd <mbxCommand> CFG_RING, mbxStatus <mbxStatus>, ring <num>

DESCRIPTION: Adapter initialization failed when issuing a CFG_RING mailbox command.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0447: Adapter failed init, mbxCmd <mbxCommand> CONFIG_LINK mbxStatus <mbxStatus>

DESCRIPTION: Adapter initialization failed when issuing a CONFIG_LINK mailbox command.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0448: Adapter failed to init, mbxCmd <mbxCommand> READ_SPARM, mbxStatus <mbxStatus>

DESCRIPTION: Adapter initialization failed when issuing a READ_SPARM mailbox command.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0449: lpfc_%attr attribute cannot be initialized to %d, allowed range is [%min, %max]

DESCRIPTION: Sysfs attribute value written exceeds attribute range
DATA: (1) attribute name (2) value written (3) minimum value (3) maximum value
SEVERITY: Error
LOG: Always
ACTION: Write a value within the supported range.

elx_mes0450: lpfc_%attr attribute cannot be set to %d, allowed range is [%min, %max]

DESCRIPTION: Sysfs attribute value written exceeds attribute range
DATA: (1) attribute name (2) value written (3) minimum value (3) maximum value
SEVERITY: Error
LOG: Always
ACTION: Write a value within the supported range.

elx_mes0451: Enable interrupt handler failed

DESCRIPTION: The driver attempted to register the HBA interrupt service routine with the host operating system, but failed.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or driver problem. If the problem persists, report the error to Technical Support.

elx_mes0453: Adapter failed to init, mbxCmd <mbxCommand> READ_CONFIG, mbxStatus <mbxStatus>

DESCRIPTION: Adapter initialization failed when issuing a READ_CONFIG mailbox command.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0454: Adapter failed to init, mbxCmd <mbxCommand> INIT_LINK, mbxStatus <mbxStatus>

DESCRIPTION: Adapter initialization failed when issuing an INIT_LINK mailbox command.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0455: Vital Product

DESCRIPTION: Vital product data (VPD) contained in the HBA flash.
DATA: (1) vpd[0] (2) vpd[1] (3) vpd[2] (4) vpd[3]
SEVERITY: Information
LOG: LOG_INIT verbose
ACTION: No action needed, informational.

elx_mes0457: Adapter Hardware Error

DESCRIPTION: The driver received an interrupt indicating a possible hardware problem.
Data: (1) status (2) status1 (3) status2
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

elx_mes0458: Bring adapter online

DESCRIPTION: The FC driver has received a request to bring the adapter online. This may occur when running lputil.
DATA: None
SEVERITY: Warning
LOG: LOG_INIT verbose
ACTION: None required.

elx_mes0460: Bring adapter offline

DESCRIPTION: The FC driver has received a request to bring the adapter offline. This may occur when running lputil.
DATA: None
SEVERITY: Warning
LOG: LOG_INIT verbose
ACTION: None required.

elx_mes0462: Too many cmd / rsp ring entries in SLI2 SLIM

DESCRIPTION: The configuration parameter for Scan-down is out of range.
DATA: (1) totiocb (2) MAX_SLI2_IOCB
SEVERITY: Error
LOG: Always
ACTION: This is a software driver error. If this problem persists, report these errors to Technical Support.

elx_mes0466: Too many cmd / rsp entries in SLI2 SLIM

DESCRIPTION: The driver has configured too many command and response IOCBs in all rings.
DATA: (1) total configured IOCBs (2) maximum number allowed.
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

FARP Events (0600 - 0699)

elx_mes0600: FARP-RSP received from DID <did>

DESCRIPTION: A FARP response was received.
DATA: None
SEVERITY: Information
LOG: LOG_IP verbose
ACTION: None required.

elx_mes0601: FARP-REQ received from DID <did>

DESCRIPTION: An unsolicited FARP request was received.
DATA: None
SEVERITY: Information
LOG: LOG_IP verbose
ACTION: None required.

FCP Traffic History (0700 - 0799)

elx_mes0700: SCSI layer issued LUN reset (<target>,<LUN>)

DESCRIPTION: The SCSI layer is requesting the driver to abort I/O to a specific LUN.
DATA: (1) ret (2) status (3) result
SEVERITY: Error
LOG: Always
ACTION: Check the state of the target in question.

elx_mes0702: Issue Target Reset to TGT <num>

DESCRIPTION: The SCSI layer detected that it needs to abort all I/O to a specific target. This results in an FCP Task Management command to abort the I/O in progress.
DATA: (1) rpi (2) flags
SEVERITY: Information
LOG: LOG_FCP verbose
ACTION: Check the state of the target in question.

elx_mes0703: Issue LUN Reset to TGT <num> LUN <num>

DESCRIPTION: The SCSI layer detected that it must abort all I/O to a specific device. This results in an FCP Task Management command to abort the I/O in progress.
DATA: (1) rpi (2) flags
SEVERITY: Information
LOG: LOG_FCP verbose
ACTION: Check the state of the device in question.

elx_mes0704: At limitation of <total> preallocated command buffers.

DESCRIPTION: The maximum number of command buffers have already been allocated.
DATA: None
SEVERITY: Warning
LOG: LOG_FCP verbose
ACTION: None required.

elx_mes0705: Allocation request of <num> command buffers will exceed max of <hba_queue_depth>. Reducing allocation request to <size>

DESCRIPTION: The number of command buffers requested will exceed the maximum so a smaller quantity will be allocated.
DATA: None
SEVERITY: Warning
LOG: LOG_FCP verbose
ACTION: None required.

elx_mes0706: Failed to allocate command buffer.

DESCRIPTION: There was not enough memory on the system to allocate a command buffer.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: This error could indicate a heavily loaded system or a memory leak. If the problem persists, report the error to Technical Support.

elx_mes0707: driver's buffer pool is empty, IO busied.

DESCRIPTION: Resources were not available to process an IO request. A busy status will be returned.
DATA: None
SEVERITY: Information
LOG: LOG_FCP verbose
ACTION: None required.

elx_mes0710: Iodone <target>/<lun>cmd <cmd> error <result> SNS <lp> <lp3>

DESCRIPTION: This error indicates that the Fibre Channel driver is returning a SCSI command to the SCSI layer in error or with sense data.
DATA: (1) retry (2) resid
SEVERITY: Information
LOG: LOG_FCP verbose
ACTION: None required.

elx_mes0711: detected queue full - lun queue depth adjusted to %d

DESCRIPTION: The driver detected a queue full status on a scsi command response. New lun queue depth is reported
DATA: (1) New lun queue depth
SEVERITY: Warning
LOG: LOG_FCP verbose
ACTION: This may indicate an oversubscribed target array. Check your SAN configuration and IO workload.

elx_mes0714: SCSI layer issued bus reset

DESCRIPTION: The SCSI layer is requesting the driver to abort all I/Os to all targets on this HBA.
DATA: (1) ret
SEVERITY: Error
LOG: Always
ACTION: Check the state of the targets in question.

elx_mes0715 - Bus Reset I/O flush failure: cnt <cnt> left <index>

DESCRIPTION: Timed out while waiting during a bus reset.
DATA: none
SEVERITY: Information
LOG: LOG_FCP verbose
ACTION: If other errors are also occurring, please report this message to Technical Support.

elx_mes0716: FCP read underrun, expected <len>, residual <resid>

DESCRIPTION: An FCP device provided less data than was requested.
DATA: (1) fcpi_parm (2) cmnd[0] (3) underflow
SEVERITY: Information
LOG: LOG_FCP verbose
ACTION: None required.

elx_mes0717: FCP command <cmd> residual underrun converted to error

DESCRIPTION: The driver converted this underrun condition to an error based on the underflow field in the SCSI command.
DATA: (1) len (2) resid (3) underflow
SEVERITY: Information
LOG: LOG_FCP verbose
ACTION: None required.

elx_mes0718 - Unable to dma_map_single request_buffer: <dma_error>

DESCRIPTION: An error occurred while sending a command, and the command will be retried.
DATA: none
SEVERITY: Error
LOG: Always
ACTION: If the problem persists, please report the error to Technical Support.

elx_mes0719 - LUN Reset I/O flush failure: cnt <cnt>

DESCRIPTION: Timed out while waiting during a LUN reset.
DATA: none
SEVERITY: Information
LOG: LOG_FCP verbose
ACTION: If other errors are also occurring, please report this message to Technical Support.

elx_mes0720 - FCP command <cmnd[0]> residual overrun error.

DESCRIPTION: A residual overrun error has occurred while processing the specified FCP command.
DATA: (1) request_bufflen (2) resid
SEVERITY: Warning
LOG: LOG_FCP verbose
ACTION: If the problem persists, check the targets for errors.

elx_mes0729: FCP cmd <cmnd> failed <target>/<lun> status: <status> result: <result>

DESCRIPTION: The specifed device failed an FCP command.
DATA: (1) ulpContext (2) iotag
SEVERITY: Warning
LOG: LOG_FCP verbose
ACTION: Check the state of the target in question.

elx_mes0730: FCP command failed: RSP

DESCRIPTION: The FCP command failed with a response error.
DATA: (1) resp_info (2) scsi_status (3) ResId (4) SnsLen (5) RspLen (6)rspInfo3
SEVERITY: Warning
LOG: LOG_FCP verbose
ACTION: Check the state of the target in question.

elx_mes0734: FCP read check error

DESCRIPTION: The issued FCP command returned a read check error.
DATA: (1) fcpDl (2) rspResId (3) fcpi_parm (4) cmd[0]
SEVERITY: Warning
LOG: LOG_FCP verbose
ACTION: Check the state of the target in question.

elx_mes0735: FCP Read Check Error and Underrun Data.

DESCRIPTION: HBA reported under run from storage array
DATA: (1) vpi (2) fcpDI (3) res_id (4) fcpi_parm
SEVERITY: Warning
LOG: LOG_FCP_ERROR verbose
ACTION: No action needed, informational.

elx_mes0748: Abort handler timed out waiting for abort to complete:ret <status> D <target id> LUN <lun id>

DESCRIPTION: The abort handler timed out waiting for abort to complete.
DATA: None
SEVERITY: Error
LOG: Always
ACTION: None required.

elx_mes0749: SCSI layer issued abort device

DESCRIPTION: The SCSI layer aborted a device.
DATA: (1) ret (2) id (3) lun (4) snum
SEVERITY: Warning
LOG: LOG_FCP verbose
ACTION: None required.

Node Table Events (0900 - 0999)

elx_mes0900: Cleanup node for NPort <nlp_DID>

DESCRIPTION: The driver node table entry for a remote NPort was removed.
DATA: (1) nlp_flag (2) nlp_state (3) nlp_rpi
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0901: FIND node DID reglogin

DESCRIPTION: The driver is searching for a node table entry, on the binding list, based on DID.
DATA: (1) ndlp (2) nlp_DID (3) nlp_flag (4) data1
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0902: FIND node DID prli

DESCRIPTION: The driver is searching for a node table entry, on the binding list, based on DID.
DATA: (1) ndlp (2) nlp_DID (3) nlp_flag (4) data1
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0903: FIND node DID npr

DESCRIPTION: The driver is searching for a node table entry, on the binding list, based on DID.
DATA: (1) ndlp (2) nlp_DID (3) nlp_flag (4) data1
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0904: Add NPort <did> to <list> list

DESCRIPTION: The driver is putting the node table entry on the specified list.
DATA: (1) nlp_flag
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0905: FIND node DID unused

DESCRIPTION: The driver is searching for a node table entry, on the binding list, based on DID.
DATA: (1) ndlp (2) nlp_DID (3) nlp_flag (4) data1
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0908: FIND node DID plogi

DESCRIPTION: The driver is searching for a node table entry, on the plogi list, based on DID.
DATA: (1) ndlp (2) nlp_DID (3) nlp_flag (4) data1
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0929: FIND node DID unmapped

DESCRIPTION: The driver is searching for a node table entry, on the unmapped node list, based on DID.
DATA: (1) ndlp (2) nlp_DID (3) nlp_flag (4) data1
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0930: FIND node DID mapped

DESCRIPTION: The driver is searching for a node table entry, on the mapped node list, based on DID.
DATA: (1) ndlp (2) nlp_DID (3) nlp_flag (4) data1
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0931: FIND node DID adisc

DESCRIPTION: The driver is searching for a node table entry, on the binding list, based on DID.
DATA: (1) ndlp (2) nlp_DID (3) nlp_flag (4) data1
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

elx_mes0932: FIND node did <did> NOT FOUND

DESCRIPTION: The driver was searching for a node table entry based on the DID and the entry was not found.
DATA: (1) order
SEVERITY: Information
LOG: LOG_NODE verbose
ACTION: None required.

Security Events (1000 - 1099)

Elx_msg1003 Send dhchap challenge local wwpn <) local_wwpn > remote_wwpn < remote_wwpn >

DESCRIPTION: Informational message during DH-CHAP authentication challenge and response process.
DATA: (1) local_wwpn (2) remote_wwpn
SEVERITY: Information
LOG: LOG_SECURITY
ACTION: Software driver Info. Contact Technical Support for further information.

Elx_msg1005 AUTHENTICATION_FAILURE Nport:<port>

DESCRIPTION: The system detected DH-CHAP authentication failure on a port.
DATA: nlp_DID
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Verify authentication settings and keys on local and remote port.

Elx_msg1006 Bad Name tag in auth message < message >

DESCRIPTION: DH-CHAP Authentication process failed when invalid tag was detected.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1007 Bad Name length in auth message < message >

DESCRIPTION: DH-CHAP Authentication process failed when invalid name was detected.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1008 Bad Number of Protocols <message>

DESCRIPTION: DH-CHAP Authentication process failed due to unexpected protocol number.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1009 Bad param type <message>

DESCRIPTION: DH-CHAP Authentication process failed when invalid protocol was detected.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1010 Bad Tag 1 <message>

DESCRIPTION: DH-CHAP Authentication process failed when bad Tag was detected.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg 1011 Auth_neg no hash function chosen.

DESCRIPTION: DH-CHAP Authentication process failed when an incorrect hash function was specified.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1012 Auth_negotiate Bad Tag <message>

DESCRIPTION: DH-CHAP Authentication process failed due to bad Tag for auto negotiation.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg 1013 Auth_negotiate no DH_group found.

DESCRIPTION: DH-CHAP Authentication process failed when incorrect or missing DH Group was detected.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1014 dhchap challenge bad name tag <message>

DESCRIPTION: DH-CHAP Authentication process failed when incorrect Challenge name tag was detected.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1015 dhchap challenge bad name length <message>

DESCRIPTION: DH-CHAP Authentication process failed due to unexpected Challenge name length.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1016 dhchap challenge Hash ID not Supported <message>

DESCRIPTION: DH-CHAP Authentication process failed due to uncorroborated Challenge Hash ID.
DATA: message
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1017 dhchap challenge could not find DH Group.

DESCRIPTION: DH-CHAP Authentication process failed due to uncorroborated Challenge Group.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_mes1019 Request tranid <tran_id> timed out

DESCRIPTION: A transaction with storage array could not complete due to timeout
DATA: tran_id
SEVERITY: Warning
LOG: LOG_SECURITY verbose
ACTION: Software driver warning. If this problem persists, report these errors to Technical Support.

Elx_mes1020 Dropped Message type <msg_type> to PID < fc_service_pid > : < fn > err < err >

DESCRIPTION: A netlink message was dropped due to some error. Display shows the message type, PID, service pid, function and error.
DATA: (1) msg_type (2) fc_service_pid (3) fn (4) err
SEVERITY: Warning
LOG: LOG_SECURITY
ACTION: Software driver warning. If this problem persists, report these errors to Technical Support.

Elx_mes1021 ERROR: attempted to queue security work, when no workqueue created.

DESCRIPTION: Driver encountered missing queue required for processing security information
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report these errors to Technical Support.

Elx_mes1022 Security request does not exist.

DESCRIPTION: A security request operation failed because there was no match found for such request.
DATA: None
SEVERITY: Warning
LOG: LOG_SECURITY
ACTION: Software driver warning. If this problem persists, report these errors to Technical Support.

Elx_mes1023 Warning - data may have been truncated. Data: <data> reqdl: <data_len> mesdl:<data_len>

DESCRIPTION: A security message exchange operation failed because the response was missing or unreliable.
DATA: None
SEVERITY: Warning
LOG: LOG_SECURITY
ACTION: Software driver warning. If this problem persists, report these errors to Technical Support.

Elx_ msg1025 Received security config local_wwpn:< > remote_wwpn:<> mode:<> hash <> :bidir <> dh_group<> reauth_interval <>

DESCRIPTION: Re-Authentication succeeded.
DATA: (1) local_wwpn (2) remote_wwpn (3) auth_mode (4) hash_len (5) hash_priority (6) bidirectional (7) dh_group_len (8) dh_group_priority (9) reauth_interval
SEVERITY: Information
LOG: LOG_SECURITY
ACTION: Informational message only. If you have questions please contact the Technical Support.

Elx_msg1028 Start Authentication: No buffers

DESCRIPTION: The authentication failed because some memory resources were not allocated.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1029 Reauthentication Failure

DESCRIPTION: The driver encountered errors and there was a failure to re-authenticate..
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg 1031 Start Authentication: Get config failed.

DESCRIPTION: The authentication failed due to some error during port configuration.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1032 Start Authentication: get config timed out.

DESCRIPTION: The node authentication was aborted because waiting for port configuration to complete, timed out.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1033 Received auth_negotiate from Nport: < nlp_DID>

DESCRIPTION: Unsolicited authentication negotiation message received from a port.
DATA: nlp_DID
SEVERITY: Warning
LOG: LOG_SECURITY
ACTION: No action, this message is informational.

Elx_msg1034 Not Expecting Challenge - Rejecting Challenge.

DESCRIPTION: Unsolicited authentication challenge received from a port, was rejected.
DATA: None
SEVERITY: Warning
LOG: LOG_SECURITY
ACTION: Software driver warning. If this problem persists, report errors to the Technical Support.

Elx_msg1035 Transport ID does not match - Rejecting Challenge.

DESCRIPTION: Security Authentication failed due to contradictory Transport ID.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_mag1036 Authentication transaction reject - re-auth request reason <reason> exp <explaination>

DESCRIPTION: An Authentication was rejected and requested again due to reason as displayed with explanation.
DATA: (1) reason (2) explanation.
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1037 Authentication transaction reject - restarting authentication, reason <reason> exp <explaination>

DESCRIPTION: An Authentication process was rejected then restarted and authentication requested again due to reason as displayed with explanation.
DATA: (1) reason (2) explanation.
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support

Elx_ msg1038 Authentication not required by the fabric Disabled

DESCRIPTION: For a given security configuration Authentication is disabled by the fabric as it not required.
DATA: None
SEVERITY: Information
LOG: LOG_SECURITY
ACTION: Informational message only. If you have questions please contact the Technical Support.

Elx_msg1039 Not Expecting Reply - rejecting. State <state>

DESCRIPTION: An unanticipated reply was received during authentication and was subsequently rejected.
DATA: (1) auth_state.
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1040 Bad Reply trans_id- rejecting. Trans_id < trans_id > Expecting: < trans_id>

DESCRIPTION: Unexpected transaction id was received during authentication and was subsequently rejected.
DATA: (1) auth_state.
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1041 Authentication Successful.

DESCRIPTION: Authentication succeeded.
DATA: None
SEVERITY: Information
LOG: LOG_SECURITY
ACTION: Informational message only. If you have questions please contact the Technical Support.

Elx_msg1042 Re-Authentication Successful

DESCRIPTION: Re-Authentication succeeded.
DATA: None
SEVERITY: Information
LOG: LOG_SECURITY
ACTION: Informational message only. If you have questions please contact the Technical Support.

Elx_msg1046 Authentication Successful.

DESCRIPTION: Authentication succeeded.
DATA: None
SEVERITY: Information
LOG: LOG_SECURITY
ACTION: Informational message only. If you have questions please contact the Technical Support.

Elx_msg1047 Re-Authentication Successful

DESCRIPTION: Re-Authentication succeeded.
DATA: None
SEVERITY: Information
LOG: LOG_SECURITY
ACTION: Informational message only. If you have questions please contact the Technical Support.

Elx_ msg1049 Authentication is enabled but authentication service is not running.

DESCRIPTION: Discovery failed because DH-CHAP Authentication was enabled while no authentication service was established.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Start the authentication daemon (fcauthd).

Elx_ msg1050 Authentication mode is disabled, but is required by the fabric.

DESCRIPTION: Discovery failed because the switch fabric required authentication, but authentication was not configured or the authentication mode for this port pair is disabled.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Configure the driver to authenticate with the switch or disable authentication on the switch to this port.

Elx_msg1053 Start Authentication: Security service offline.

DESCRIPTION: The authentication failed because security service was not available.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_msg1055 Authentication parameter is disabled, but is required by the fabric.

DESCRIPTION: FLOGI failed because the fabric has indicated that Authentication is required, but authentication has not yet been configured or enabled on the HBA.
DATA: None
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Configure authentication on this HBA.

Elx_msg 1056 Authentication mode is disabled, but is required by the fabric.

DESCRIPTION: The discovery failed because fabric requires authentication mode but that mode is currently disabled.
DATA: None
SEVERITY: Information
LOG: LOG_SECURITY
ACTION: Informational message only. If you have questions please contact the Technical Support.

Elx_msg1057 Authentication transaction reject. reason <reason> exp <explaination>

DESCRIPTION: An Authentication was rejected and requested again due to reason as displayed with explanation.
DATA: (1) reason (2) explanation.
SEVERITY: Error
LOG: LOG_SECURITY
ACTION: Software driver Error. If this problem persists, report errors to the Technical Support.

Elx_mes1058 Waiting for authentication service.

DESCRIPTION: There was a delay when the authentication service was not initially available as expected.
DATA: None
SEVERITY: Warning
LOG: LOG_SECURITY
ACTION: Software driver warning. If this problem persists, report these errors to Technical Support.

Elx_mes1059 Authentication became avaiable.

DESCRIPTION: The authentication service came online but was not initially available as expected.
DATA: None
SEVERITY: Warning
LOG: LOG_SECURITY
ACTION: Software driver warning. If this problem persists, report these errors to Technical Support.

Miscellaneous Events (1200 - 1299)

elx_mes1209: C_CT request error

DESCRIPTION: The CT response returned more data than the user buffer could hold.
DATA: (1) outdmp->flag (2) 4096
SEVERITY: Information
LOG: LOG_LIBDFC verbose
ACTION: Modify the user application issuing a CT request to allow for a larger response buffer.

Link Events (1300 - 1399)

elx_mes1300: Re-establishing Link, timer expired

DESCRIPTION: The driver detected a condition where it had to re-initialize the link.
DATA: (1) fc_flag (2) hba_state
SEVERITY: Error
LOG: Always
ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

elx_mes1301: Re-establishing Link

DESCRIPTION: The driver detected a condition in which it had to re-initialize the link.
DATA: (1) status (2) status1 (3) status2
SEVERITY: Information
LOG: LOG_LINK_EVENT verbose
ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

elx_mes1302: Invalid speed for this board: Reset link speed to auto: <cfg_link_speed>

DESCRIPTION: The driver is reinitializing the link speed to auto-detect.
DATA: None
SEVERITY: Warning
LOG: LOG_LINK_EVENT verbose
ACTION: None required.

elx_mes1303: Link Up Event <eventTag> received

DESCRIPTION: A link up event was received. It is also possible for multiple link events to be received together.
DATA:(1) fc_eventTag (2) granted_AL_PA (3) UlnkSpeed (4) alpa_map[0]
Detail: If link events received, log (1) last event number received, (2) ALPA granted, (3) Link speed (4) number of entries in the loop init LILP ALPA map. An ALPA map message is also recorded if LINK_EVENT verbose mode is set. Each ALPA map message contains 16 ALPAs.
SEVERITY: Error
LOG: Always
ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

elx_mes1304: Link Up Event ALPA map

DESCRIPTION: A link up event was received.
DATA: (1) wd1 (2) wd2 (3) wd3 (4) wd4
SEVERITY: Warning
LOG: LOG_LINK_EVENT verbose
ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

elx_mes1305: Link Down Event <eventTag> received

DESCRIPTION: A link down event was received.
DATA: (1) fc_eventTag (2) hba_state (3) fc_flag
SEVERITY: Error
LOG: Always
ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

elx_mes1307: READ_LA mbox error <mbxStatus> state <hba_state>

DESCRIPTION: The driver cannot determine what type of link event occurred.
DATA: None
SEVERITY: Information
LOG: LOG_LINK_EVENT verbose
ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network. May indicate a possible hardware or firmware problem.

IOCTL Events (1600 - 1699)

elx_mes1601: libdfc ioctl entry

DESCRIPTION: The entry point for processing an ioctl.
DATA:(1) lpfc_cmd (2) lpfc_arg1 (3) lpfc_arg2 (4) lpfc_outsz
SEVERITY: Information
LOG: LOG_LIBDFC verbose
ACTION: None required.

elx_mes1602: libdfc ioctl exit

DESCRIPTION: The exit point for processing an ioctl.
DATA:(1) rc (2) lpfc_outsz (3) lpfc_dataout
SEVERITY: Information
LOG: LOG_LIBDFC verbose
ACTION: None required.

elx_mes1604: libdfc error

DESCRIPTION: An error occurred in the lpfcdfc ioctl module.
DATA: (1) error number index
SEVERITY: Error
LOG: Always
ACTION: Reduce the application program's SCSI send request buffer size to less then 320K bytes.

VPort Events (1800 - 1832)

elx_mes1800 Could not issue unreg_vpi.

DESCRIPTION: Driver attempt to unregister vpi failed
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1801 Create vport work array FAILED: cannot do scsi_host_get.

DESCRIPTION: The driver was unable to get a reference to a SCSI host.
DATA: None
SEVERITY: Warning
LOG: LOG_VPORT verbose
ACTION: Software driver warning. If this problem persists, report these errors to Technical Support.

elx_mes1802 HBQ <index> : local_hbqGetIdx <index> is > than hbqp->entry_count <count>

DESCRIPTION: An error occurred when processing queue related to an HBA in a particular slot.
DATA: (1) hbqno (2) local_hbqGetIdx (3) entry_count
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1803 Bad hbq tag. Data: <tag> <count>

DESCRIPTION: An error occurred when processing queue related tags for an HBA in a particular slot.
DATA: (1) tag (2) buffer_count
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1805 Adapter failed to init.Data: <command> <status> <queue num>.

DESCRIPTION: An error occurred when processing queue related tags for an HBA in a particular slot.
DATA: (1) mbxCommand (2) mbxStatus (3) hbaqno
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1806 Mbox <command> failed. No vport.

DESCRIPTION: A mailbox command could not be communicated because there was no vport associated with the mailbox command.
DATA: mbxCommand
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1807 IOCB <value> failed. No vport

DESCRIPTION: An IOCB command could not be communicated because there was no vport associated with the mailbox command.
DATA: ulpCommand
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1808 Create VPORT failed: NPIV is not enabled: SLImode <mode>

DESCRIPTION: The driver failed to create a port because the HBA was in wrong mode or was not capable of NPIV.
DATA: (1) sli_rev
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Load the driver with npiv enabled on an HBA that supports SLI-3.

elx_mes1809 Create VPORT failed: Max VPORTs (<vpi>) exceeded.

DESCRIPTION: The driver failed to create a port because the maximum number of port supported by the driver will be exceeded.
DATA: (1) max_vpi
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: No Action. The driver can not create any more Vports.

elx_mes1810 Create VPORT failed: Cannot get instance number.

DESCRIPTION: The driver failed to allocate resources for an adapter and could not assign an instance number
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1811 Create VPORT failed: vpi x<vpi>.

DESCRIPTION: The driver failed to create a port and had to eliminate all its resources.
DATA: vpi
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1812 vport_delete failed: Cannot delete physical host

DESCRIPTION: An attempt to delete a port failed because it was to delete a physical port and not a virtual port. Only vports on physical ports can be deleted on an NPIV system.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1813 Create VPORT failed. Cannot get sparam.

DESCRIPTION: The port could not be created because it could not be initialized possibly due to unavailable resources.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1815 Could not issue unreg_did (default rpis)

DESCRIPTION: Attempt to unregister rpi failed
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1816 FLOGI NPIV supported, response data <port>

DESCRIPTION: The fabric reports support for NPIV upon FLOGI
DATA: (1) response_multiple_NPort
SEVERITY: Warning
LOG: LOG_VPORT verbose
ACTION: No action needed, informational.

elx_mes1817 Fabric does not support NPIV - configuring single port mode

DESCRIPTION: The fabric reports no support for NPIV upon FLOGI
DATA: None
SEVERITY: Warning
LOG: LOG_VPORT verbose
ACTION: No action needed, informational.

elx_mes1818 VPort failed init, mbxCmd <mailbox command> READ_SPARM mbxStatus <mailbox status> , rc = <status>.

DESCRIPTION: A pending mailbox command issued to initialize port, failed.
DATA: (1) mbxCommand (2) mbxStatus (3) rc
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1819 Unrecognized lpfc_sli_mode parameter: <mode>.

DESCRIPTION: The user has attempted to set the SLI mode to an invalid value. The only valid values for the SLI mode are 0, 2, and 3.
DATA: (1) lpfc_sli_mode
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: The lpfc_sli_mode driver parameter setting must be corrected. Valid values are 0, 2, and 3.

elx_mes1820 Unable to select SLI-3. Not supported by adapter.

DESCRIPTION: The HBA is not capable of operating in a given mode.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: SLI-3 mode is only available on some HBAs. Do not attempt to force the SLI mode to 3 on HBAs that do not support SLI-3 mode. This is an informational message. HBAs that do not support SLI-3 will be configured to run in SLI-2 mode, but it is recommended to use the auto setting (0).

elx_mes1821 Create VPORT failed. Invalid WWN format

DESCRIPTION: The port could not be created due to an invalid WWNN or WWPN format.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Provide a valid WWN when creating Vports.

elx_mes1822 Invalid <name>: <xx: xx: xx: xx: xx: xx: xx: xx>.

DESCRIPTION: An invalid WWN was used when creating a vport.
DATA: (1) type_name (2) wwn[1] (3) wwn[3] (3) wwn[5] (4) wwn[7]
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: When creating a vport you must furnish a valid WWN.

elx_mes1823 Create VPORT failed. Duplicate WWN on HBA.

DESCRIPTION: The port could not be created because it would duplicate an existing WWNN HBA address. The resources for the port had to be discarded.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Provide a WWN that is unique.

elx_mes1824 NPIV enabled: Override lpfc_sli_mode parameter (<mode>) to auto(0).

DESCRIPTION: The lpfc_enable_npiv and lpfc_sli_mode driver parameter settings conflict. The HBA must be configured for SLI-3 mode to support NPIV.
DATA: (1) lpfc_sli_mode
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: This is an informational message that indicates that the lpfc_enable_npiv and lpfc_sli_mod parameter settings are not compatible. Resolve the parameter conflict by setting the SLI mode to 0 or 3 or, if SLI-2 mode is required then disable NPIV.

elx_mes1825 Vport Created.

DESCRIPTION:. This message is displayed to indicate that a port was created in the system. It is displayed at this level to ensure it is always appears at all log levels.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: No action, informational.

elx_mes1826 Vport Disabled.

DESCRIPTION: The port had to be disabled in the system
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: No action, informational.

elx_mes1827 Vport Enabled.

DESCRIPTION: The port had to be enabled after possible recovery from some errors.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: No action, informational.

elx_mes1828 Vport Deleted.

DESCRIPTION: A Vport was deleted.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: No action, informational.

elx_mes1829 CT command failed to delete objects on fabric.

DESCRIPTION: A command issued to the fabric to delete an associated resource for an object such as for a port, failed.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

elx_mes1830 Signal aborted mbxCmd <command>

DESCRIPTION: A pending mailbox command was aborted because the thread received a signal.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: You should retry the attempted command.

elx_mes1831 Create VPORT Interrupted.

DESCRIPTION: The port creation process was unexpectedly interrupted at a critical time and the operation was unsuccessful.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: The process was interrupted while creating a vport. Retry the command.

elx_mes1832 Delete VPORT can not proceed at this time due to SCSI layer busy.

DESCRIPTION: An attempt to delete a port failed because it was deemed unsafe as the system was not was not in proper state, such as link down or SCSI layer has not released all the targets associated with the port.
DATA: None
SEVERITY: Error
LOG: LOG_VPORT verbose
ACTION: Retry the command. If this problem persists, report these errors to Technical Support.